

APPENDIX B
USEPA AND PARTNER AGENCY COMMENTS AND RESPONSES

**RESPONSE TO USEPA COMMENTS DATED MARCH 24, 2005
YARD 520 SAP AND RI/FS WORK PLAN
PINES AREA OF INVESTIGATION**

For convenience, the comments received from USEPA have been numbered. The original comments are repeated in bold, with the response shown in plain text. Comments on the Quality Management Plan (Volume 7 of the RI/FS Work Plan) were received separately but are also included herein.

General Comments:

G.1 - In general, these documents represent a significant effort by the responsible party group to address the questions raised in the Administrative Order on Consent that need investigation. The attached comments, if implemented, will adequately cover the deficiencies that EPA and its agency partners see in the draft RI/FS work plan toward achieving the goals of the AOC.

Response: Thank you!

G.2 - Many questions were raised regarding the proposed Yard 520 sampling. Due to the differences in the north and south cells, sampling should be equally divided between the north and south cells due to potential inhomogeneities in the CCB composition. These locations should be continuously cored and terminated at the base of the landfill when native soil is encountered. Each boring should then be plugged, from top to bottom, with bentonite. TAL metals should also be a part of the landfill flyash characterization. A location near the topographically high center area of the North Landfill should also be used as a piezometer and a vertical flyash characterization profile should be performed.

Response: The objective of the Yard 520 SAP is to answer the question raised by the USEPA concerning the possible presence of certain parameters (dioxins/furans, PAHs, radionuclides) in CCBs in the Pines Area of Investigation. Its purpose is not to perform a detailed characterization of Yard 520 itself, but rather to obtain information about these parameter groups. As explained in the Yard 520 SAP, sample locations in the Type III (South) Area at Yard 520 were selected as the most appropriate locations from which to obtain samples to address the USEPA's concern.

Specific modifications to the Yard 520 SAP are discussed in the specific comments and the revised plan itself. Additional characterization of conditions at and around Yard 520 is included in the FSP of the RI/FS Work Plan. It should be noted that regulatory management of Yard 520 falls under the jurisdiction of IDEM's Office of Land Quality. For the purposes of the RI/FS, it is only information about what may be migrating in groundwater from Yard 520 that is of interest.

G.3 - The proposed plan states that the existing monitoring wells at yard 520 will be sampled as a part of this investigation, but the sampling will be performed by another contractor. Any proposed additional contractors that will be collecting information that will be used as a part of this Order must be approved by U.S. EPA in advance and their locations, methods, and procedures approved. It is generally not a good idea to perform sampling by two different contractors due to the potential for inherent differences which might confuse results.

Response: The Respondents understand the point raised by this comment. The on-going monitoring at Yard 520 is being performed to meet objectives that are different from those of the RI, and under a different regulatory authority. However, while this analytical information may not be suitable for certain uses in the RI/FS (such as risk assessment), it may be suitable for other uses. Other types of data, including well construction, geologic and water level data collected by other contractors and/or by the USGS may also be suitable for use during the RI/FS.

The Respondents have proposed a structured hierarchy to evaluate the potential use of historical data for the RI/FS. The use of such data will vary depending on the objectives, methodologies, and quality assurance program under which the data were collected. The proposed data useability criteria are outlined in the following table. Existing data will be evaluated, and its suitability for use will be determined using these criteria.

Historical Data Useability

Type	Data Useability	Description
A	Qualified for use in the RI/FS	Data collected per the approved RI/FS Work Plan, maintaining consistency with approved SOPs, QAPPs, and DQOs. SOPs, QAPP, and DQOs are specifically developed to meet RI/FS objectives including use in risk assessment. Specific data uses are presented in work plans.
A	Qualified for use in the RI/FS	Data collected by others under a documented QA program. QA program, field and laboratory methods are available and equivalent to the RI/FS. Appropriate documentation is available. If all conditions are consistent with those presented in the RI/FS, then these data are qualified for uses detailed in the RI/FS.
B	Qualified for some uses in the RI/FS	Non-chemical data, such as geology, hydrology, physical data, not collected under the approved work plans, but which was collected by equally qualified personnel using methods that are no different than in the plans (e.g., USGS geology, geology from Yard 520, water levels, well construction information, etc.)
C	Qualified for limited uses in the RI/FS	Data collected by other qualified personnel, using methodologies and approaches known to be different from approved RI/FS work plans. QA programs and/or field/laboratory methods known to be different so resulting data is known to be not comparable. Not to be combined with RI/FS data. Appropriate uses to be determined by professional judgment.
D	Not suitable for use in RI/FS	Data collected by unidentified and/or unqualified personnel with little to no documentation (i.e., unidentified samplers, methodologies, locations), from locations that were not properly recorded or are now destroyed.

As an example of these criteria, historic data collected at Yard 520 are expected to fall into either the Type B or the Type C categories. Geologic information and well construction records would be Type B data, and these data would be used during the RI/FS in interpreting geologic conditions in the

vicinity of Yard 520. However, analytical groundwater data collected between 1989 and the present would be Type C data, as it is known that the objectives, procedures, and QA program are not equivalent to the RI/FS Work Plan. Therefore, this chemical data cannot be combined with the RI/FS chemical data, for example, for use in the risk assessment. However, the data does have other uses, such as to evaluate trends, to examine relationships between different chemicals, and to evaluate the presence of vertical concentration gradients. Where appropriate, proposed uses for these data have been specified in the revised FSP.

As specified in the revised FSP, certain data will be collected during the RI/FS from selected Yard 520 wells. Slug tests will be conducted. Groundwater samples will be collected to provide analytical data that can be used quantitatively in conjunction with all the RI/FS analytical data.

Therefore, historical data that has been collected outside the RI/FS Work Plan may be suitable for certain uses in the RI/FS. Suitability will be determined based on the criteria provided in the attached table, which will be included in the revised QAPP.

G.4 - Additional information relating to the DNL is needed during the first phase. The proposed piezometer location within DNL near the north end of Maple Street should be moved approximately 250 feet southeast and installed as a monitoring well based on the results of residential well sampling. In addition, due to the potential for storm events transporting contaminated sediment past the channeled area of Brown Ditch, a sediment sampling location is needed that is located within the DNL at a mutually agreed point of sediment deposition.

Response: The location of the proposed piezometer can be modified as requested, as long as the new location remains within the wetland system. It will not be completed as a well at this time. Sampling results from monitoring wells in this area along West Dunes Highway (i.e., locations C and D) will be used to determine whether a monitoring well to the north in IDNL may be needed.

A sediment sampling location in the downstream portion of Brown Ditch in IDNL will be located near the confluence of the small tributary flowing east (out of Great Marsh) (see response to comment FSP.8).

G.5 - More information is needed in the area of greatest apparent contaminant flow at the northeast corner of Yard 520. Additional vertical profiling should be performed. One transect parallel to apparent flow (SW-NE) through Yard 520 and one transect perpendicular (NW-SE) will be required.

Response: As described in more detail in the responses to specific comments, additional wells will be sampled, and the piezometer to be installed in this area will be converted to a monitoring well (new well location V) to provide the necessary information. There are a number of existing Yard 520

monitoring wells in this area which provided geologic and historic water quality information (see response to comment G.3). Vertical profiling will also be performed at location V.

G.6 - There were many comments regarding procedures to be used to determine the presence or absence of a potentially contaminated aquifer in the southern portion of the area of investigation. The remedial investigation must contain assurances that the elimination of the southern area from investigation must be based upon a physical determination that no aquifer exists that could be capable of carrying CCB-related contaminants.

Response: Additional information is being provided in the revised Field Sampling Plan to clarify what types of information will be evaluated and the decisions to be made (see comment WP.5).

G.7 - The Order requires sampling of residential groundwater wells. Sampling results from at least a portion of these wells should be a part of the investigation. Many of the residential wells have completion information that can be used to validate the information collected. This well-established and important pathway cannot be left out of the investigation.

Response: The Field Sampling Plan does include sampling of residential wells. The available well construction information has been reviewed. Wells that have well construction information have been added to the revised FSP. Where specific criteria are met (see comment HHRA.1), data from these wells will be used in the RI.

G.8 - Sediment sampling should be expanded to include a 0-6" and a 6-12" sample in order to capture potential deeper burrowing ecological receptors. In addition, since the Brown and Kintzle ditch systems have historically been maintained for drainage, they have likely undergone periodic dredging. It is important to determine where the dredge spoil has been placed and sample those areas for CCBs. A common location for dredge spoil disposal is on the banks of a ditch.

Response: The 0-6 inch surficial sediment strata is generally considered the most biologically active zone, but the deep 6-12-inch layer may also contain biota and would reflect historical sediment quality or deposition events. However, it is uncertain whether there are 12-inch depth sediment deposits throughout Brown Ditch, (e.g., areas of West Branch where channel is relatively new). Areas of deeper sediment deposition will be identified as part of the reconnaissance of the Brown Ditch stream channel (to be conducted prior to sampling), which will identify and field locate sampling locations (in consensus with USEPA). If deeper sediments (>8-in) exist, two samples will be taken at depths of 0-6 inches and 6-12 inches, respectively. If sediment depth is < 8 inches or clay or sand is encountered, a single sample will be taken.

Sediments will be placed in approved sample containers and stored at the laboratory under appropriate conditions. Some deep sediment samples (6-12 inches) will be archived for analysis as

described below. Chemical analyses will be conducted on all surficial (0-6 inches) sediment samples and selected deep (6-12 inches) samples. Based on the results of these chemical analyses, additional deep samples may be analyzed.

The history of the site indicates that the West Branch of Brown Ditch was recently created (1980s) and therefore the excavated material there would not reflect the presence of historical sediments. The deepening of the East Branch in 1982 may have resulted in some historic dredge material which may be considered for sampling if identifiable in the field. This identification of historic dredge spoil will be a task for the reconnaissance of the Brown Ditch stream channel.

Yard 520 Sampling and Analysis Plan

As discussed with USEPA, the revised Yard 520 SAP and its QAPP will be re-submitted on June 3, 2005.

Y520.1 - Elements of "Draft" Version of the QAPP Needed to Complete the Review

Note: The entire QAPP should scrupulously follow the Instructions prepared by Region 5 Superfund Division.

Response: The Yard 520 SAP was intended to include both a field sampling plan and the necessary quality assurance components. It was not intended as a stand-alone QAPP. To address the many comments related to QAPP components and formatting, a separate QAPP has been prepared to accompany the revised Yard 520 SAP.

Y520.2 - A1- Title and Approval Sheet

Response: As noted in the response to comment Y520.1, a separate QAPP has been prepared that includes this information.

Y520.3 - A2- Table of Contents must include a list of the figures and tables and appendices.

Response: The Table of Contents for the Yard 520 SAP does include a list of tables, figures, and appendices.

Y520.4 - A3- Distribution List; This element is missing *should be a table* or a written description of qualifications of major individuals and how they fit into the project process see: Region 5 QAPP Instructions.

Response: As noted in the response to comment Y520.1, a separate QAPP has been prepared that includes this information.

Y520.5 - A4- Project Organization

Response: The Yard 520 SAP does include a description of the project organization. This information will be repeated in the QAPP to accompany the revised Yard 520 SAP.

Y520.6 - A5- Problem Definition/Background; The problem definition and background are clearly stated. What is the history of the North Yard? Please elaborate here in the QAPP.

Response: The history of Yard 520 is included in the Site Management Strategy. Additional information has been provided in the revised Yard 520 SAP.

Y520.7 - A6 - Project/Task Description

Quantity Objectives and Criteria for Measurement Data

Although the number of samples is discussed, the rational for the selection of 10 sites and their placement is not sufficiently described in this section or anywhere else in the QAPP. Such attempts to quantify the decision process must be made by the use of appropriate statistical design. See guidance element 7 and EPA QA/G-4. More detail is required for this element.

It is also of concern that there was a decision made not to sample in the adjacent site (Yard 520 North) without giving any appropriate rational for this decision.

Your Section 4.0 entitled Field Sampling Procedures belongs here under Project/Task description.

Response: The USEPA requested approximately five to 10 samples to evaluate the presence of dioxins/furans, PAHs, and radionuclides in CCBs in the Pines Area of Investigation. The sampling plan includes 10 samples of CCBs from Yard 520. Based on further discussions regarding the background samples, the Yard 520 sampling plan now proposes a total of 25 samples to be collected in background locations. This will include 10 samples collected along roadways, 10 samples located in non-roadway areas (see comment Y520.25), and 5 samples located in wetland areas. Additional rationale on sample locations is being provided in the revised Yard 520 SAP and accompanying QAPP.

Y520.8 - In Section 4.2 : Selection of Sample Locations Within Yard 520

- 1. Please define Type II and Type III here in the QAPP.**
- 2. With regard to the Table on page 2-2:**

A detailed rational for the selection of boring sites is required here.

Response: The definitions of Type II and Type III wastes are provided in the Site Management Strategy document, but will be repeated in the QAPP. As noted in response to comment Y520.7, rationale on sample locations is being provided in the revised Yard 520 SAP and accompanying QAPP.

Y520.9 - A9.- Documentation and Records

Response: The Yard 520 SAP does include a discussion of documentation and records. This information will be repeated in the separate QAPP to accompany the revised Yard 520 SAP.

Y520.10 - B1.- Sampling Methods Requirements. Field sampling SOPs are required for all samples with a rational for each. No rational is given for choosing new sites except for a general discussion in the work plan.(See *element B1 in Region 5 Instructions for Sampling Design*.) A detailed description of the methodology you plan to use to select “background locations” is required. *Background* must also be defined.

Response: This element of the QAPP guidance is being addressed in the separate QAPP. Rationale for sample selection is being included and “background” defined.

Y520.11 - B4.- Analytical Methods Requirement. Nonstandard methods are not addressed. It seems to this reviewer that the analysis of the samples you are planing [sic] to take for the site constitutes nonstandard samples because of the presence of CCBs.

Response: Inorganic analyses conducted to date on potential CCB samples have not indicated interferences by the matrix. A discussion of the CCB matrix and organic analyses is presented in response to comments Y520.12 and Y520.13 below.

Y520.12 - Table 1. All MRLs are ½ the expected values except for 2,3,7,8-Tetra-CDD. Please explain. Does the lab expect any problem with the matrix in the samples you will have analyzed. Carbon is well know to strongly adsorb organic compounds. Has the lab ever analyzed any control samples with a matrix with similar chemical characteristics to the samples you are planning to analyze? If so, is there a more realistic MRL for such samples? Please include a brief explanation of these questions if the QAPP in a section to precede the Tables in Section 9.

Response: In response to this comment, the laboratory provided their updated MRLs, which are based on a March 2005 MDL study. These estimated MRLs are included in the separate QAPP. Actual MRLs achieved for the samples will likely vary due to factors such as percent moisture or analytical dilutions.

CCB samples are not expected to contain particularly high levels of carbon. The carbon that makes up coal is largely burned to generate power in the power plant. Coal-combustion by-products (CCBs) are made up of the non-combustible portions of the coal, typically mineral and other inorganic fractions. The residual carbon content in CCBs is similar to or lower than typical soils. The Site Management Strategy provides a more detailed description of origin and chemical composition of CCBs.

In addition, matrix spike samples are being collected and analyzed to evaluate potential biases that may be caused by the matrix.

Y520.13 - Table 2. All MRLs are 1/5 the expected values except for all the listed polyaromatic compounds (PAHs) Once again the values seem too good to be true and suspicious since all of the compounds in the table are listed as having a PQL of 6.6 ug/Kg. Please explain. Does the lab expect any problem with the matrix in the samples you will have analyzed? Carbon is well know to strongly adsorb organic compounds. Has the lab ever analyzed any control samples with a matrix with similar chemical characteristics to the samples you are planning to analyze? If so, is there a more realistic MRL for such samples? Please include a brief explanation of these questions if the QAPP in a section to precede the Tables in Section 9.

Response: The PAHs listed in Table 2 have MRLs lower than full-scan PAHs due to the use of the selected ion mode (SIM), which gives greater sensitivity. It should be noted that these MRLs are estimated and that actual MRLs will likely be higher due to sample-specific factors such as percent moisture and analytical dilutions.

As noted in response to comment Y520.12, CCB samples are not expected to contain particularly high levels of carbon. The carbon that makes up coal is largely burned to generate power in the power plant. Coal-combustion by-products (CCBs) are made up of the non-combustible portions of the coal, typically mineral and other inorganic fractions. The residual carbon content in CCBs is similar to or lower than typical soils. The Site Management Strategy provides a more detailed description of origin and chemical composition of CCBs.

In addition, matrix spike samples are being collected and analyzed to evaluate potential biases that may be caused by the matrix.

Y520.14 - Table 3; Laboratory Reporting Levels for Radionuclides. There is a discrepancy in some of the reported achievable levels of detection of specific radionuclides and those achievable routinely by EPA laboratories. For example, according to EPA method 901.1 the detection limit (DL) for Uranium-235 background is usually 0.046pCi/g (so 0.2pCi/g DL is too high, should be at least .02pCi/g or less), and EPA reference 600/4-80-032 gives a DL for Thorium-234 of 0.1pCi/g (not 6.59pCi/g), Thorium-227 should have a DL of at least 0.013pCi/g (background is usually 0.046pCi/g), and for Ra-226 has a background of 0.52pCi/g so this DL must be loess than 0.52pCi/g (at least 0.2pCi/g), Actinium-228 usually occurs at a level of 0.5pCi/g or less(therefore 1.11pCi/g is not sensitive enough to detect AC-228), Bi-212 occurs at 1.0pCi/g in background so .56pCi sensitivity is a bit high and will require long counting times, Pb-214 occurs in background at 1pCi/g or so 0.64 is probably too high and not sensitive enough DL, Tl-208 has a background usually of 0.15pCi/g in soils so a DL of 0.29pCi/g is too high, and Pa-234 normally has a background value of 1.0pCi/g, therefore a DL of 33.6pCi/g will not be sufficient to detect Pa-234 if present at the site.

Response: The list of radionuclides has been revised and now includes Ac-227, Pa-231, Pb-210, Po-210, Ra-226, Ra-228, Th-228, Th-230, Th-232, U-234, U-235, and U-238. Detection limits for these

radionuclides are included in the separate QAPP. To the extent possible, they are of sufficient sensitivity to achieve the DQLs established from both risk-based and background levels.

Y520.15 - Table 4: Laboratory Reporting Levels for Inorganics (replace with Inorganic Compounds, Inorganics is not a term.) One of the Practical Quantitation Limits (PQL) are higher than one would expect for inorganic analysis in a soil matrix. Thus: The PQL for Selenium is reported as 20 mg/kg when one would expect a value of 3.5 mg/kg; whereas several of the listed metals seem to have unusually low PQLs; for example Aluminum has a PQL ½ of the expected value, and Barium and Cadmium are almost too good to be true with values for the PQL of 1/10 the expected PQL. How realistic are these reported PQLs to the CCB samples you intend to collect? Does the lab have previous experience measuring inorganic compounds in CCBs matrixes?

Response: The PQLs in Table 4 have been evaluated in comparison to the actual PQLs being achieved in the suspected CCB samples currently being analyzed under the MWSE SAP. The separate QAPP to accompany the revised Yard 520 SAP includes any revisions to the PQLs.

As noted in response to comment Y520.12 above, CCB samples are not expected to contain particularly high levels of carbon. The carbon that makes up coal is largely burned to generate power in the power plant. Coal-combustion by-products (CCBs) are made up of the non-combustible portions of the coal, typically mineral and other inorganic fractions. The residual carbon content in CCBs is similar to or lower than typical soils. The Site Management Strategy provides a more detailed description of origin and chemical composition of CCBs.

The matrix spike samples currently being collected and analyzed indicate no systematic bias caused by the CCB matrix.

Y520.16 - The laboratory schedule table should be here in the QAPP.

Response: As noted in the response to comment Y520.1, a separate QAPP has been prepared that will include this information.

Y250.17 - B5. - Quality Control Requirements; No schedule of sampling is given in Field Sampling Plan. What are the specific criteria for each chemical to be measured? Express in general terms of mathematical analysis for QC statistics: include bias and accuracy calculations.

Response: As noted in the response to comment Y520.1, a separate QAPP has been prepared that includes quality control information, including acceptance criteria and calculations for bias and precision.

The schedule for sampling is dependent on USEPA approval of the revised Yard 520 SAP. It is the intention of the Respondents to implement this sampling as soon as feasible upon USEPA approval of the SAP.

Y520.18 - B8.-Inspection/Acceptance Requirements for Supplies and Consumables. Specific names and titles required for field operations, not just laboratory personnel.

Response: This information is included in the separate QAPP.

Y520.19 - B9- Data Acquisition Requirements for Non-direct Measurements. There is no documentation of rational for original data collection and its relevance to the project. If during the process of conducting the approved analyses for VOCs and SVOCs, tentatively identified compounds (TICs) are identified and estimated in quantity, Section IV of the presently effective Consent Order requires submission of "all results of sampling and tests and all other data received.". To satisfy this requirement, the analytical results on the TICs must be provided. Please include the previous paragraph in the QAPP.

Response: Data acquisition requirements for non-direct measurements are addressed in the separate QAPP. The proposed analyses in the Yard 520 SAP are PAHs and do not include VOCs, full-list SVOC, or TICs.

SOPs

Y520.20 - SOP No:EXT-3550BPines. Method 3550B has been deleted and is upgraded to method 3350C. There are some very significant differences in the old and the new method and in the interest of the use of best available technology (BAT) the newer method is the only acceptable method. Some of the changes are that a 3/4 inch horn is required for low concentration analysis, and the use of a Sonebex™ disrupter system is recommended from Ultrasound, I.c., model 432B or equivalent

Response: In a recent check of the on-line SW-846 methods, it appeared that Method 3550B is still valid. The USEPA reviewer indicates that one of the changes is the use of a ¾-inch horn, which the laboratory is currently using. A copy of the revised SOP is included in the QAPP, along with the other laboratory SOPs.

Y520.21 - Section 1.1 Have 2-5 CCB samples collected from areas outside of the landfill. Off-yard deposits also have potential for impacting human health and the environment and probably should be given at least some characterization.

Response: Samples of suspected CCBs outside Yard 520 are being collected in accordance with the Municipal Water Service Extension Sampling and Analysis Plan (MWSE SAP), submitted to USEPA in 2004 and conditionally approved on March 22, 2005.

Y520.22 - Section 2.0: Describe visual inspection criteria.

Response: The rationale for visual inspection is described in more detail in Sections 4.2 and 4.3. The native soils in the Area of Investigation are typically white to tan sands in uplands and fine-grained organic soils in the lowlands. Fill materials, including suspected CCBs, have a distinctly different appearance in the field. The visual inspections are intended to ensure that samples of appropriate media are collected, for example, of suspected CCBs (rather than clay used as interim cover) or of native soils (without the presence of fill). The visual inspection will consist of examining and logging the observed soil materials. The plan has been revised to make this more clear.

Y520.23 - Section 2.3 Is data analysis and report writing the same as Database Activities and Data Submittal? Please clarify. Please provide the relationship between the timing of the sampling described in this document and the overall RIFS. More sampling for the potential COCs may be required as a part of the wider RIFS effort.

Response: AOC II requires that analytical data be submitted to USEPA once it is validated. Once validation is complete, the validated data will be uploaded into the project database along with validation qualifiers (database activities). The database is then used to generate the data reports to be submitted to USEPA (data submittal).

As noted in Section 2.3, the data evaluation and interpretation will be provided to the USEPA as a technical memorandum or addendum to the RI/FS Work Plan. It is recognized that the results will be used to determine whether additional RI activities are needed. Therefore, the Respondents would like to implement the Yard 520 sampling as soon as approval is received from the USEPA.

Section 2.3 will be modified to clarify the schedule components.

Y520.24 - Section 4.2: Explain how to insure that the variability expected in the CCB's will be covered by the planned sampling.

Response: The proposed sample locations will be modified slightly to collect more samples of older CCBs. The Type III (South) Area was used from approximately 1986 to 2001 (see chronology in Appendix D of the Site Management Strategy). The switch from high sulfur to low sulfur coal occurred in 1992. Therefore, the materials in the Type III (South) Area include CCBs derived from both types of coal. The proposed sample locations have been modified so that more samples are collected from the western side of the Type III (South) Area, where older CCBs are located. A detailed rationale is being included in the revised Yard 520 SAP.

Y520.25 - Section 4.3—background samples in roadside right-of-ways may be impacted by roadside runoff, which has the potential to result in erroneously high estimates of background concentrations of at least some COCs. Samples should be collected as far as is possible from the road (consistent with legal access) and in areas not likely to be impacted by runoff (ex. not in an area where surface drainage from the road would be concentrated) to minimize the potential for erroneous results.

Response: Because roadways transect residential areas, potential human receptors are exposed to materials along roadsides. Therefore, background sampling along roadsides provides relevant information regarding baseline exposures in the area. In order to provide information regarding potential exposures in non-roadside areas, a second set of background samples will be collected as suggested above. Additionally, samples from within wetland areas are also being collected. The sampling plan has been modified to include these additional background sample locations.

Y520.26 - The text is unclear as to whether or not plant matter (including roots and decaying matter) is to be included or excluded from these samples—especially the samples from the wetland area. The text seems to indicate that at least plant matter above ground surface will be excluded from the sample, at least for the non-wetland soils, but doesn't explicitly say so. I think USEPA preference is for the sample to exclude plant matter. Please clarify this issue.

Response: The intention is to remove foreign material from the samples. For typical granular soils, plant debris, particularly the surface litter layer, will be removed. But where plant material is a natural part of the soil structure, especially for samples of peat, it will not be removed. The text has been clarified.

Y520.27 - Is it valid to add the samples from the wetland area to the statistical work up of the background soils? Given the almost certain difference in soil type, pH, organic carbon content, mineralogy, etc. between the wetland areas and the other background locations it may be prudent to require an outlier test for these locations before including them in the analysis.

Response: We will consider whether to evaluate the background data in separate groups based on soil type and/or location. Details on the statistical evaluation are provided in the Human Health Risk Assessment Work Plan, part of the RI/FS Work Plan.

Y520.28 - Please explain the set of statistical analyses—tests for normal or lognormal distribution, robust methods to handle non-detects, outlier testing, etc. that will be used. These will become important if there needs to be a determination of whether or not a COC exceeds background.

Response: A statistically rigorous method for determining whether a constituent is consistent with background will be employed for constituents with concentrations above health based levels. If it is

determined by this method that a constituent concentration is consistent with background, the constituent will be eliminated from further consideration in the risk assessment. Section 3.3.2 of the HHRA Work Plan presents the methods for statistical analysis.

Y520.29 - Section 4.4.1—Please clarify if the vertical location of the sample will be restricted to its depth? Or is the GPS surveying meant to allow an estimate of the altitude of the sample as well? In which case what is the accuracy of the altitude measurement? Presumably it isn't 3-5 meters. Please clarify.

Response: The GPS unit also provides information on elevation (altitude), which is recorded in the field, although it is less accurate than the horizontal readings. The selected GPS unit has been modified in the revised Yard 520 sampling plan and information on accuracy provided.

Y520.30 - Section 4.4.3—parts of the text seem to imply that the actual sample material that is to be submitted to the lab for analysis will not be described, only the stuff that is left over. Obviously, this would not be optimal. Please clarify what materials will actually be described.

Response: The text has been clarified.

Y520.31 - It would be best to backfill the entire hole with bentonite, rather than just the top 3 feet. This technique would likely form a better seal.

Response: The CCBs removed from the borings are a Type III Restricted Waste and were disposed of at Yard 520 under its operating permit. Therefore, the CCBs removed during coring will be replaced back into Yard 520. As explained in the Yard 520 SAP, the upper 3 feet of each boring will be filled with bentonite to ensure a surface seal.

Y520.32 - Section 4.4.4: Please explain how to insure that background locations do not have CCBs.

Response: Suspected CCBs in the Area of Investigation are typically visually distinguishable from the sands and peats that are the native soils. Therefore, sample locations will be selected where suspected CCBs do not appear to be present. In addition, the SAP also specifies that additional volume will be collected so that additional testing can be performed to verify CCB content.

Y520.33 - Section 7.2.1: 2nd para: please edit to the following: ...it will be necessary that all levels of project management and U.S. EPA be notified for approval.

Response: The text will be modified as requested. The revised text will be included in the separate QAPP to accompany the revised Yard 520 SAP.

Y520.34 - Table 3—analyses should include the total concentrations of at least U, Ra, and Th, not just the isotopes listed in the table. Restricting the analyses to specific isotopes, U-235 for example, is likely to result in a substantial underestimation of the concentration of these elements in the samples

Response: The list of radionuclides will include the suggested analytes. In addition, the list has been modified to agree with the list of radionuclides associated with coal ash as defined in:

USEPA. 1993. *Diffuse NORM Wastes - Waste Characterization and Preliminary Risk Assessment*. Prepared by S. Cohen and Associates, Inc., and Rogers & Associates Engineering Corp., for the U.S. Environmental Protection Agency Office of Radiation and Indoor Air.

The list of radionuclides to be evaluated, based on USEPA, 1993, is therefore: Ac-227, Pa-231, Pb-210, Po-210, Ra-226, Ra-228, Th-228, Th-230, Th-232, U-234, U-235, and U-238. The sampling plan has been modified.

Y520.35 - Table 4—the MDL for sulfur seems rather high. Is this a typical value?

Response: The current MDL for sulfur is lower and will be included in the separate QAPP to accompany the revised Yard 520 SAP.

RI/FS Work Plan - Volume 1, Work Plan Overview

WP.1 - Table 1—groundwater characterization also should include characterization of groundwater use, including which aquifers are and were used by how many people at what parts of the area of investigation.

Response: Table 1 has been modified to reflect that the groundwater characterization portion of the RI will include characterization of groundwater use to the extent possible.

WP.2 - The part about accelerated investigations is unclear. Accelerated investigations will be performed on what media? In which areas? Aside from the sampling of CCBs near the water line extensions and the sampling associated with the potential contaminants in CCBs in the landfill (with the associated background soil sampling), which are covered in the second paragraph, please describe anything that would be part of this type of investigation.

Response: The proposed investigations are discussed in detail in the Field Sampling Plan. For the Overview, the discussion of accelerated investigation in Table 1 has been revised to specify the specific investigations to occur.

WP.3 - Section 4.3.1—it is unclear how determination of type of fill as a CCB or some other material is to be accomplished by laboratory analysis. Is there some component of CCBs (B?) that isn't likely a component of other fill?

Response: To the degree possible, the Respondents are currently evaluating laboratory and test methods to be used to determine whether suspected CCBs are actually CCBs. See also response to comment FSP.12.

WP.4 - Last line 3rd para: ...and/or other CCB constituents above appropriate screening levels...

Response: The referenced sentence has been revised as follows: "In addition, these data will be used in conjunction with groundwater quality data to assess the extent to which the CCBs may be contributing to the presence of boron and molybdenum, and/or other *CCB-derived* constituents above appropriate screening levels in groundwater."

WP.5 - Last line 5th para: If a surficial aquifer is not present or useable in the south area of the study and no deeper aquifer has the potential for CCB contamination, further investigation...

Response: Referenced sentence has been revised as follows: "If a surficial aquifer is not present or useable in the south area of the study, and there is no potential for CCB-derived constituents to be present in other aquifers in this area, further investigation of CCB-related constituents in groundwater in this area is not warranted."

WP.6 - Is the last paragraph in this section mislocated? It would appear to be more appropriate in section 4.3.2.

Response: Agreed; however, the last paragraph of Section 4.3.1 discusses the investigations that will be conducted in the southern portion of the Area of Investigation, which will help determine whether additional investigations will be needed in this area. Thus, the cited paragraph will remain with Section 4.3.1.

WP.7 - Section 4.3.2—most of the objectives outlined in this section aren't actually objectives. Consider tightening the language.

Response: The language has been modified.

WP.8 - Section 4.4.3—CCBs also should be evaluated for physical and chemical characteristics by type of CCB.

Response: The language has been modified.

WP.9 - Section 4.5: 4th para: Some residential properties in the area are large enough to be potentially considered habitat areas.

Response: The parenthetical "... (i.e., the SERA will not evaluate the fill in residential yards, along street margins, etc., because they are not ecological habitats) ..." has been deleted. Elements of the ecological assessment are detailed in Volumes 2 and 5 of this Work Plan.

RI/FS Work Plan - Volume 2, Field Sampling Plan

FSP.1 - Model development will require an assessment of current and historical water use in the area, particularly the areas that have been replaced by municipal water. This assessment—including the aquifers used by each well, the number and locations of the wells, estimated per capita water use, etc., should be described here and/or in the work plan.

Response: As noted in the FSP (Section 2.2.6), a separate technical memorandum will be prepared and submitted for review that will detail the scope of work for the numerical modeling. The numerical modeling process will include an evaluation of groundwater usage (see also response to comment WP.1).

FSP.2 - Fly ash contains higher concentrations of toxic metals as opposed to bottom ash or slag. Metals such as boron, chromium, cobalt, molybdenum, and nickel have fusion (melting) temperatures exceeding 1000 degrees C. Such metals are generally found in fly ash occurring as a particle size of 250 microns or smaller. The samples taken should include a sieve analyses of the sample fraction less than 250 micron particle size. Fly ash has a high mechanical strength and a melting point above 1000 degrees C. CCB samples should include a sieve analysis using a 0.30 millimeters or No.50 mesh size sieve opening. The total as well as each fraction should be weighed and analyzed separately on a dry basis for the Table 1 analytes. CCB types may have been mixed when used as fill material. The distribution of the results may help identify areas with higher fly ash percentage of total. This does not apply to native soil samples unless the soil sample taken cannot be visually distinguished from CCBs.

Response: Sieving is not a standard procedure for obtaining data for use in a risk assessment following USEPA guidance. The FSP includes sieve analysis (grain size) on approximately 10 of the suspected CCB samples collected under the MWSE SAP. The test method to be used (ASTM D422-63) will provide the percentage of the samples smaller than 0.3mm. No additional analysis of CCB fractions is necessary for characterization of risk to human health and ecological receptors.

FSP.3A - Section 1.4.1: 4th para: Edit to read “...if either of these is true and there is no potential for other CCB-related contaminants in aquifers in the south section...”

Response: The text has been modified as noted in response to comment WP.5.

FSP.3B - Section 1.4.1, Evaluation of CCBs as Potential Sources, Page 1-5, Paragraph 4: The contractor states, “According to studies conducted by the USGS (e.g., Shedlock et al., 1994) a surficial aquifer may or may not be present in this area, or may not be present with sufficient capacity to support drinking water supply. If either of these is true (sic), further investigation of CCB-related constituents in groundwater in this area is not warranted”. If an aquifer being used

becomes contaminated with buried CCB waste, whether such aquifer is documented in the literature or not, further investigation will be required.

Response: The text has been modified as noted in response to comment WP.5.

FSP.3C - p 1-5, For clarity, specify the south portion of the Area of Investigation as that area south of Yard 520 and the existing Brown Ditch (i.e., the area where the surficial aquifer may not be present).

Response: The text has been adjusted to clarify the south area.

FSP.4A - Section 1.4.2: Add a SSW to NNE cross-section of wells/borings at the following control points:

Response: The RI report will include geologic cross-sections. The Respondents have added language to Section 2.2.3 to specify likely locations for these cross-sections. The final section locations will be determined based on the final boring/well locations and the data that are obtained.

FSP.4B - 1. A well location 100 to 300 feet south (across road) of the central portion of the south landfill where the surficial aquifer (shallow) may exist and is relatively undisturbed. Location "O" (or a location slightly west) shown in Figure 2-4 may be acceptable, but the location for aquifer profiling and subsequent well location would be best selected by first determining the saturated thickness of the shallow aquifer at several points in this area (very shallow) using direct push methods. Then you could select the location with the greatest saturated thickness for profiling and as the background well location.

Response: The proposed well at location O is intended to provide geologic information, to obtain groundwater levels south of Brown Ditch, and to evaluate groundwater quality conditions upgradient of the residences in order to complete the risk assessment. All of these objectives will be met without first establishing the aquifer thickness. Therefore, no changes are proposed. If data collected under the FSP suggest additional investigation is needed in this area, it can be performed in a later phase of the RI.

FSP.4C - 2. A well location near the center (just east) of the topographic high for the north landfill (i.e., halfway between MW-2 and TW-12).

Response: The purpose of such a well is unclear. There are numerous pre-existing wells (with boring logs) at Yard 520 that provide detailed geologic information in this area.

FSP.4D - 3. A well cluster (2 to 3 depths) with screen intervals selected on the basis of vertical profiling at the NE corner of Yard 520 where a plume may have left the site previously based on

the distribution of impacted domestic wells (intersection of Walnut and US 20 (south side)). Normally it is advisable to characterize any plume that may be present in both its vertical and horizontal concentration gradients (i.e. isopleths shown in cross-section view) before such a “snapshot” is complicated or distorted by movement to areas offsite where domestic well pumping has occurred.

Response: Along US Highway 20 on the north side of Yard 520, including at the intersection of Walnut and US 20, there are a number of pre-existing wells and well pairs associated with Yard 520. These include MW-1, MW-13S, MW-13D, TW-12, MW-7, MW-14S, MW-14D, TW-15S, TW-15D, MW-6, TW-17S, TW-17D, TW-18S, TW-18D, TW-19S, and TW-19D. (Well construction information is included on Table 2-2 of the FSP; boring logs are included in the Site Management Strategy.) These wells are more than sufficient to evaluate geologic conditions and possible vertical concentration gradients in this vicinity based on historic data.

East of Yard 520, the proposed piezometer will be converted to a well (location V) to obtain geologic and water quality information in this area. Vertical profiling will also be performed at this location.

FSP.4E - 4. The well location depicted previously by ENSR in fig. 2-10 (location E or further west) immediately west of Brown ditch may be acceptable. However, topographic lows along the dune crest should be favored as the location for wells rather than topographic highs along the dune crest (i.e. along the crest of the dune ridge that underlies the Town of Pines). Depending on how closely the water table surface conforms to or mirrors topography, topographic high spots along the dune crest could induce subtle, localized water table highs that would facilitate a southerly gradient being interpreted from the potentiometric surface data, whereas wells placed at topographically low points along the same dune ridge may indicate (more accurately) a northerly flow direction. Because the potential groundwater divide beneath the dune ridge is so subtle and potentially affected by domestic well discharge and seasonal recharge, it is unclear at this point to what degree the placement of wells (in highs or lows) along the dune crest will have on the interpreted gradients/flow directions. For this reason, placement of wells in topographic lows along the crest or dune trend will be more conservative and should give a better indication of the local potentiometric surface and gradients that may occur throughout the year. Location E appears to be on a topographic high along the dune crest/ridge so it should be moved off this feature (e.g., 100 to 200 feet west).

Response: The regional USGS hydrogeologic information suggests that water table gradients in this area are shallow, which is consistent with the permeable nature of the dune sands. Therefore, it will be important to evaluate the locations of groundwater divides (i.e., between branches of Brown Ditch) as chemical migration will be limited by the divides. Accordingly, wells are proposed at several locations anticipated to be at or near the divides, to help define the divides. In addition, the use of a numerical groundwater flow model will aid in characterizing groundwater flow directions. No changes are proposed.

FSP.5 - Depending on the shallow aquifer saturated thickness, cluster wells should be considered at one or more of the above 4 selected locations to accurately characterize the vertical distribution of contaminants in the aquifer for future groundwater modeling. Each location should have one boring that penetrates 6 feet into the clay aquitard beneath the shallow aquifer so that the contact is confirmed. Gamma ray logging could ensure that stratigraphic correlation and identification of aquifer heterogeneities within the shallow aquifer are understood along potential flow paths (as per Section F of IDEM Technical Guidance Document Vol 1 in Appendix). Existing well 18D along with other key wells should also be included in the logging effort as should the proposed piezometer location immediately east of TW 18D to provide this hydrogeological information perpendicular to the potential flow path for any plume leaving the site.

Response: As noted in the FSP (Section 2.4.2), the vertical profiling is intended to be used to establish well screen intervals. If the vertical profiling suggests significant differences between the water table and deeper portions of the surficial aquifer, well pairs will be considered. The text has been modified to make this more clear.

Borings will extend into the clay aquitard 4 feet (i.e., two split-spoon lengths). The text has been modified to make this more clear.

Observations of soils will be made via continuous split spoon sampling during drilling. Gamma logging at this stage of the RI is not necessary. However, the wells will be in place should it be determined that gamma logging may be useful in certain areas for later phases of the RI.

FSP.6 - It is not clear how you are selecting the best location for monitoring wells (e.g., are you using hypothetical flow paths based on the present distribution and understanding of contamination?).

Response: The monitoring well locations were generally selected based on the detections of boron and molybdenum in private well samples, and conceptual understanding of groundwater flow directions based on USGS regional studies and local studies at Yard 520. However, to meet the project objectives, wells are proposed in both expected up- and downgradient directions, as well as at and across expected groundwater divides. So while the proposed well locations are based on expected flow directions, their usefulness is not dependent on these flow directions. Text has been added to Section 2.2.2 to clarify the approach.

FSP.7 - Lithologic descriptions from cores or split spoon samples and gamma ray logging should provide cross-sectional information perpendicular to the likely plume flow path (NNE) at the boundary of or immediately north of Yard 520. This will be crucial information in building an accurate groundwater flow model and in determining smaller scale aquifer heterogeneities that may affect fate and transport of contaminants in the shallow aquifer.

Response: Consistent with the response in FSP.4, geologic descriptions from borings, wells, and test pits will be synthesized and used to complete cross-sections through the Area of Investigation. This is described in greater detail in FSP.4 and in Section 2.2.3 of the FSP. Gamma logging will not be performed during this phase of the RI.

FSP.8 - Section 1.4.4 and Section 1.4.5 p. 1-7

An additional sediment sampling location in the Brown ditch system within the Dunes National Lakeshore is needed at a point of reduced stream velocity and sediment accumulation. As a result of the channeled nature of a large portion of Brown ditch in the downstream area from Yard 520, high flow events may have resulted in contaminated sediments bypassing the proposed sampling areas and accumulating in down stream areas.

Response: USEPA and NPS have previously considered the assessment of potential residual CCB materials arising from historic fluvial transport via Brown Ditch and possible deposition in IDNL lands. Accordingly, it is proposed to identify and sample a sediment deposition area within Brown Ditch in IDNL. This location will be field-located in an area of local deposition or where flow spreads into a larger wetland area. Since this area may be located near the confluence of the small unnamed tributary flowing east (out of Great Marsh), it is another compelling reason to consider regional background in the SERA. Examination of this sediment may find inorganic concentrations (other than CCBs) exceeding benchmarks and consideration of regional levels (reflecting local land use and air deposition) is an appropriate tool. The FSP has been modified to include this additional sample.

FSP.9A - Section 2.1.3, Sampling of CCBs at Yard 520, Sampling Summary: The draft states, "Under Yard 520 SAP (ENSR, 2004b), ten CCB samples will be collected from the South (Type III) Area of Yard 520, as shown on Figure 2-1." This number of CCB samples should be split between the south and Yard 520 North (Type II) Area. The engineering design of the South Landfill makes it an unlikely source for a significant contaminant release to groundwater. Further, the South Landfill likely contains a different type of CCB (low sulfur) rather than the North Landfill (high sulfur CCB).

Response: The purpose of the samples to be collected at Yard 520 under the Yard 520 SAP is to answer questions raised by the USEPA concerning the possible presence of dioxins, PAHs, and radionuclides in CCBs in the Area of Investigation. Sample locations were selected in the Type III (South) Area because only CCBs were disposed there. The Type III (South) Area was used from approximately 1986 to 2001 (see chronology in Appendix D of the Site Management Strategy). The switch from high sulfur to low sulfur coal occurred in 1992. Therefore, the materials in the Type III (South) Area include CCBs derived from both types of coal. Additional rationale for sampling locations has been provided in the revised Yard 520 SAP. The proposed sample locations have been modified so that more samples are collected from the western side, representing the older materials. (See

response to comment Y520.24.) In addition three samples of CCBs from three locations in the Type II (North) Area will be analyzed for TAL metals under the RI/FS Work Plan.

FSP.9B - In addition, continuous cores should be collected and any CCB waste visually encountered should be sampled and analyzed for constituents associated with CCBs and these constituents are outlined in Table 2.1. The coring depths should be terminated at the base of the landfill when native soil is encountered.

Response: The requested work is not needed to meet the objectives of the Yard 520 sampling plan. However, samples from the Type II (North) Area at Yard 520 will be collected under the RI/FS Work Plan. Borings will extend to the base of the fill material.

FSP.9C - A discrete groundwater sample should be taken in each boring where groundwater is encountered from both Yard 520 North and South Areas.

Response: The requested work is not needed to meet the objectives of the Yard 520 sampling plan. However, the RI for the Pines Area of Investigation will evaluate CCB-derived constituents in groundwater that may be migrating from Yard 520. To that end, groundwater samples will be collected from selected Yard 520 monitoring wells. TW-18S and TW-18D were included in the FSP and TW-15S/D and TW-16S/D have been added in the revised FSP. These wells are located to the west and east, respectively, of TW-18 and on US Highway 20 closer to Yard 520.

FSP.9D - Each boring should be then be plugged with bentonite.

Response: See response to comment Y520.31.

FSP.9E - A vertical profile of CCB constituent concentrations should be performed at the North Landfill including the underlying shallow aquifer to best understand the geochemical environment in unsaturated (vadose) and saturated zones, as only then can a fate and extent model be accurately constructed and a source term developed for modeling purposes.

Response: The requested work is not needed to meet the objectives of the Yard 520 sampling plan. However, the RI for the Pines Area of Investigation will evaluate CCB-derived constituents in groundwater that may be migrating from Yard 520. See response to comment FSP.9C.

FSP.10 - Three fly ash leaching test data sets are needed; 1) from suspected CCB (probably old & high sulfur) from fill areas that have likely generated leachate in the past, 2) from CCB in N. Landfill (also older and high sulfur) that have likely generated significant leachate in the past which discharged to the surficial aquifer, and 3) from CCB from South Landfill (relatively young and predominately low sulfur). Only minimum sampling seems warranted of the South Landfill due to its engineering design likely having limited any leachate discharge to groundwater. All

three data sets would be used for comparison with a background soil data set to understand how impacts to groundwater may differ across the site spatially from leaching of native soils versus that from various CCB deposits (groundwater beneath regulated landfill versus uncontrolled fill).

Response: As noted In the SMS, leaching tests (i.e., SPLP and/or TCLP) are not effective in characterizing leachability of chemicals from fly ash. The SMS included an approach to evaluate leaching that was not based on testing of soils. Instead, samples of groundwater beneath or downgradient from known CCB deposits would be collected and analyzed for CCB constituents (Section 5.2 of the SMS). The SMS was approved by USEPA in November 2004, and was the basis for the work proposed in the FSP. Accordingly, groundwater samples will be collected from wells at Yard 520 (see response to comment FSP.9C) and from new wells to be installed through suspected CCB deposits (locations G, H, and I), as detailed in Section 2.4.3 of the FSP.

FSP.11 - Target analyte metals and others (B, Mo, S and Si) should be part of the characterization of the landfill fly ash (not just the Polycyclic Aromatic Hydrocarbon and other organics, etc.).

Response: The objective of sampling CCBs in Yard 520 is to evaluate the presence of dioxins/furans, PAHs, and radionuclides. Therefore, analysis of these samples for TAL metals is not needed.

The presence of metals in suspected CCBs is being evaluated under the MWSE SAP. To date, approximately 30 samples of suspected CCBs have been collected and submitted for laboratory analysis of TAL metals, B, Mo, S, and Si in accordance with the MWSE SAP. Also, three additional samples from the Type II (North) Area at Yard 520 will be collected under the RI/FS Work Plan and analyzed for these parameters.

FSP.12 - Section 2.1.4—Field determination of the presence of CCBs is inexact, but please outline the method designed to verify that “suspected” CCBs are in fact CCBs.

Response: To the degree possible, the Respondents are currently evaluating laboratory and test methods to be used to determine whether suspected CCBs are actually CCBs. When an appropriate method has been identified, it will be submitted to USEPA in a technical memorandum or addendum to the RI/FS Work Plan for review and approval.

FSP.13 - Figure 2-5. Proposed piezometer location in the National Lakeshore near north end of Maple Street should be moved approximately 250 feet southeast (still north of railroad track) and installed as a monitoring well. This monitoring location is in-line (North-South) with a series of domestic wells along Maple Street that exceed the RAL for Boron with one well exceeding 2000 ppm Boron.

Response: See also comment G.4. The piezometer location in IDNL will be moved 250 feet southeast in accordance with the request, assuming a wetland location can be found. The objective of this piezometer is to gather water elevation data. The network of wells to the south of this piezometer (at locations A through E) will characterize groundwater conditions; based on data collected at these wells, if warranted, a monitoring well can be installed in the future.

FSP.14 - Information on the CCBs outside of Yard 520, location, thickness, extent, etc. will be collected regardless of the results of the risk assessment. Some of this information will be used to assess the risk to ground water. The text seems to indicate the need for characterization of the location, thickness, and extent of the CCBs will be dependent on the results of the sampling from Yard 520 and the water line. Please clarify. Also, when is it anticipated that those results will be available?

Response: Information about the locations and horizontal extent of CCBs outside Yard 520 will be obtained during the RI, as described in Sections 2.1.4 and 3.3.2 of the FSP. However, it is not clear whether information about thickness is needed to meet the objectives of the RI. The need to characterize deposit thickness will be based on sample results from suspected CCBs and from groundwater in the vicinity of CCBs.

Validated laboratory results for 27 samples of suspected CCBs have been submitted to USEPA. The Yard 520 sampling will be implemented upon USEPA approval of the Yard 520 SAP.

FSP.15 - Section 2.1.6—of the three well locations designed to identify the impacts of CCBs on ground water outside yard 520, only well H will penetrate CCBs based on figure 2.3. Consider moving wells G and I to areas with suspected CCBs or justify the proposed locations.

Response: The intention is for all three wells (locations G, H, I) to be installed through suspected CCBs. Note that in Figure 2-3, potential locations of CCBs are indicated with blue polygons and with blue lines (mainly along road ways). The proposed well at location H is within one of the blue polygons adjacent to Second Place where suspected CCBs were encountered in the utility trench. At proposed location G, suspected CCBs were also encountered in the utility trenches. At location I, IDEM documented 12 feet of suspected CCBs during installation of the water lines in 2003.

FSP.16 - Section 2.1.7 1st para: It is too soon to state that the source of molybdenum in the south is not CCB's. Remove.

Response: The text does not eliminate CCBs as a possible source, just states that it is less likely. However, the text (Section 2.1.8 of the revised FSP) has been modified.

FSP.17 - Section 2.2.1: p. 2-7, After first bullet and after variability add, "including any landfill induced localized mounding of the water table."

Response: The text has been modified to consider groundwater flow variability caused by heterogeneities in geologic and/or fill materials.

FSP.18A - Section 2.2.4—The text implies water levels will be collected quarterly from the Yard 520 monitoring wells but also says that permission to get water-levels from the monitoring wells at Yard 520 has not already been granted, and is not a foregone conclusion. I assume the permission that is outstanding is for the “continuous” measurements and not the quarterly. Please clarify.

Response: Access to the Yard 520 wells is not an issue as the owner is one of the Respondents. The text has been clarified.

FSP.18B - Water-levels from the monitoring wells at yard 520 are an important part of any hydrogeologic characterization and should be obtained—no ifs, ands or buts. The work plan must include quarterly data from these wells. Getting continuous measurements is not essential.

Response: There may be confusion between Yard 520 and the Pines Landfill. Water level data from all wells at Yard 520 will be used in the RI. The text has been clarified.

FSP.18C - Which Yard 520 wells are to be measured for water levels? These measurements should be collected on the same day as the measurements from the new wells.

Response: Water levels will be measured at all Yard 520 wells. Measurements will be taken synoptically (over a short period of time) at the new wells, piezometers, and the surface water stations. The text has been clarified.

FSP.19 - If permission has not been received from the USGS to collect water levels in their wells, such permission will be needed.

Response: The Respondents acknowledge the importance of cooperation with the USGS in gaining access to their wells for the purposes of water level measurements.

FSP.20 - Collect continuous water levels from one of the wells in the wetland areas so that evapotranspiration can be estimated. This estimate will help with the modeling and perhaps the ecological assessment.

Response: Continuous water level monitoring is proposed as part of the RI; the specific locations have not yet been identified. Locations will be selected after reviewing the first round of groundwater monitoring results. Collecting continuous water level data from one of the wetland areas will be considered. Text has been added to the revised FSP to note this.

FSP.21 - Page 2-9: States, “ Water levels will be measured a total of five times (once a calendar quarter, see schedule in Section 4.0) at the proposed monitoring wells to determine hydraulic gradients and groundwater flow directions in the surficial aquifer on a seasonal basis”. Sufficient flexibility should be allowed to select a storm (wet) and dry event within and as part of the given quarterly sampling and gauging schedule. Better data will result, and a more representative range of the extreme conditions can be observed.

Response: In general, water level measurements will be collected after several days of no rain so that surface water conditions in the ditches are more representative of baseflow conditions (see comment FSP.42). Evaluation of baseflow conditions is most appropriate for evaluating the groundwater to surface water pathway. However, because gauging will be scheduled to correspond to sampling events, the ability to adjust the schedule is limited.

If needed to meet specific objectives in a later phase of the RI, a round of water level measurements can be scheduled to coincide with a storm event such that aquifer and surface water responses to storm events can be evaluated. However, in general, aquifer and surface water responses to storm events can be evaluated at locations where there is continuous monitoring (via transducer).

FSP.22 - Section 2.2.5—if slug tests have not been performed on the Yard 520 monitoring wells, they should be performed. This testing will provide data for the most important part of the aquifer.

Response: Slug tests do not appear to have been performed on Yard 520 wells. The FSP has been revised to include slug testing at selected Yard 520 wells.

FSP.23 - Section 2.2.6— Preliminary data on the modeling effort is needed so that the adequacy of the data to be collected for this investigation can be better determined. For example—what are the anticipated model boundaries? What boundary conditions are anticipated? Where are the boundaries anticipated to be located? How will recharge to ground water be estimated? How will recharge from the underlying aquifer be quantified? How will historical water use be treated? (Etc.) The FSP does not appear to describe how the contractor will acquire this information. This issue needs to be more fully considered.

Response: A separate technical memorandum will be prepared and submitted for review that will detail the scope of work for the numerical modeling. This memorandum will include a summary of the conceptual model, previously presented in the SMS (ENSR, 2005), and the anticipated setup of the numerical model including model boundaries, recharge, inputs (such as hydraulic conductivity), and groundwater use. It is preferable to develop the scope of work for the modeling after field data (especially geologic information) has been collected and analyzed.

FSP.24 - Section 2.3.2—what will be done to ensure that the staff gages are not moved/removed by ice, high water, or erosion? This comment also applies to the stakes denoting the locations of the surface water and sediment sampling sites.

Response: The stakes locating the once-only sediment sampling sites would be used to show USEPA staff the location and are temporary in nature. Surface water sampling locations would require more careful placement and maintenance as they will be visited several times. For both categories, these sampling locations will be surveyed and placed in a GIS mapping system. Staff gauges need to be constructed of sturdy materials in good locations (i.e., stable channel and substrate). There is always a chance of flood events or vandalism disturbing them. The locations could also be photodocumented annually, as needed.

FSP.25 - Surface Water Levels in Ditches, Page 2-10: States, “Surface water levels will be measured at approximately 12 locations, a total of five times (once a calendar quarter)”. Surface and groundwater should be gauged concurrently and like the groundwater gauging, sufficient flexibility should be allowed to select storm (wet) and dry events as part of the given quarterly sampling and gauging schedule.

Response: The text has been clarified to indicate that the surface and groundwater will be gauged concurrently. See also the response to comment FSP.21. Measurements will typically be taken during baseflow conditions as noted in the revised text and in comment FSP.42.

FSP.26 - Section 2.3.3—what will be done to ensure that the measuring point of these piezometers is not altered by ice movement? How deep will the piezometers be? Can we collect QW data from the piezometers on the west branch of Brown Ditch?

Response: Piezometers will be constructed of sturdy materials such as steel (see Section 3.3.13 of the FSP). There is always a chance of flood events or vandalism disturbing them. Piezometers will be installed such that the top of screen is two feet below the top of the bed sediments as described in Section 3.3.13 of the FSP. Water quality samples cannot be collected from the piezometers.

FSP.27 - Pair continuous water-level measurements from the proposed surface-water station with ground-water level measurements from a piezometer at that location. This will allow continuous evaluation of surface-water/ground-water interaction.

Response: The text has been modified to indicate that continuous water level monitoring will include at least one groundwater-surface water pair. This information will help to evaluate groundwater surface water interactions and to evaluate the response of the surface and groundwater to precipitation events.

FSP.28 - Section 2.3.4—It is difficult, looking at figure 2-5 (or is figure 2-6 meant? which is also confusing) to assess where the streamflow measurements are proposed. Is this the physical analysis mentioned in figure 2-6?

Response: The figures will be clarified to indicate streamflow monitoring locations.

FSP.29 - Consider giving priority to locating the continuous surface-water measuring stage-discharge point on the west branch of Brown Ditch. This is obviously the most important surface-water reach to the investigation.

Response: Locations for continuous water level monitoring will be selected after review of the first round of water sampling. At that time, the requested location will be considered.

FSP.30 - As flow on the ditch is likely to be minimal during large parts of the year, consider the utility of increasing flow at the flow-measurement points by constricting the channel. This may pose some problems with the water-level measurements, but it might be feasible to get accurate flow and water levels if the proper locations can be selected. Alternatively (or in tandem), use of devices capable of accurately measuring small amounts of flow should be considered. A pygmy meter is a good place to start, but a flow tracker may be superior.

Response: Brown Ditch is low-gradient stream that does not easily lend itself to placement of a permanent weir (some sections are wide, some sections are deep, there could be flooding problems in some areas). However, it is not evident that interpretation of groundwater discharge or the SERA requires this level of precision in flow measurement.

FSP.31 - Section 2-4: p. 2-13, A rationale should be provided for the locations for wells “S” and “T” that are outside the Area of Investigation. A well location is needed in the National Lakeshore that is in the direction of potential contaminant migration based on the obvious occurrence of elevated Constituents of Primary Concern (e.g., Boron). Also the mentioned USGS deep wells need to be located/labeled in one of the figures provided.

Response: Proposed wells at locations S and T are provided as background wells, intended to be upgradient or cross-gradient away from the Area of Investigation (see Section 2.2.2). The well at location T is intended to be installed through the wetland soils of IDNL. The work proposed in the FSP will determine the locations of CCB-derived constituents in groundwater and the direction(s) of migration. If needed, another well in IDNL can be installed in later phases of the RI.

A map showing USGS wells has been provided in the revised FSP.

FSP.32 - Section 2.4.2—field parameters should be pH, dissolved oxygen, temperature, specific conductance, turbidity, and oxidation-reduction potential for all water samples, including these.

Response: Because the Hydropunch will provide screening-level data, full purging and parameter stabilization are not required as they will not affect the data quality for this purpose. The Hydropunches are wellpoints installed temporarily without sand pack or well development. Therefore, data from them is suitable only for screening purposes as they may not be representative of the aquifer conditions and/or what would be expected from a properly constructed and developed monitoring well. The field parameters can be readily collected; however, it must be recognized that the useability of the data is limited to screening purposes.

FSP.33 - Consider moving the vertical profiling location just south of Yard 520 (O) to a location nearer Brown Ditch. This location might be better suited to determine if there is flow under the ditch to the south.

Response: The proposed well at location O was chosen to characterize groundwater concentrations upgradient of the residences and therefore uninfluenced by septic systems. Moving this well would not satisfy the objectives. However, MW-3A associated with Yard 520 is located just south of Brown Ditch and screened in the surficial aquifer. Water level information from MW-3A can be used to evaluate groundwater-surface water relations and potential underflow beneath the ditch.

FSP.34 - Consider adding a vertical aquifer profiling location at the location of well E. This area is somewhat likely to have elevated B and assessing its vertical distribution would be important to assessing discharge to the ditch after the confluence. Also consider moving this well a bit to the south so its more in line with wells at 1716 and 1727.

Response: The proposed well can be moved slightly to the south as requested (see revised Figure 2-4). Vertical profiling at this location will not be proposed at this time, as it will be performed at locations A and V (newly proposed well, see response to comment FSP.4D). If results from those locations indicate significant differences between shallow and deep portions of the surficial aquifer, vertical profiling can then be considered at location E.

FSP.35 - Last para: Please edit line 5 to ...submitted for laboratory analysis for CCB constituents...

Response: Because these are Hydropunch data, and therefore only to be used for screening level purposes, samples will only be analyzed for boron and molybdenum which have been identified as potential indicators of CCB-derived constituents. At each of these locations, a monitoring well will be installed that will be sampled for all CCB-derived constituents. This has been clarified in the text.

FSP.36 - Evaluation of a Vertical Variation in Groundwater, Pages 2-12 and 2-13: States "Vertical profiling of groundwater will be performed at selected locations to collect data to evaluate vertical variations (locations A,F,N, and O on Figure 2-4)". An additional location should be added in the vicinity of TW-12 and the private well that is located at the abandoned

Vernier China facility. High concentrations of arsenic in groundwater were found in wells TW-12 (740 ppb) and Vernier China (1140 ppb). High boron concentrations were also found in well TW-12 (15,600 ppb). In this area, situated between Yard 520 and the Town of Pines contaminated residential wells, an understanding of the source, groundwater contact, contaminant fate and migration, can be obtained by vertical profiling.

Response: Groundwater conditions at the Vernier China facility were evaluated in 2003 ("Source Investigation and Groundwater Flow Evaluation", Weaver Boos, July 2003). Twelve Geoprobe borings were located along the northern border of Yard 520. Both shallow and deeper groundwater samples were collected at each location and analyzed for arsenic. In addition, as noted in response to comment FSP.4D, there are a number of pre-existing wells and well pairs located just north of Yard 520, including MW-1, MW-13S, MW-13D, TW-12, MW-7, MW-14S, MW-14D, TW-15S, TW-15D, MW-6, TW-17S, TW-17D, TW-18S, TW-18D, TW-19S, and TW-19D. The previously available information in this area is more than sufficient to evaluate possible vertical concentration gradients in the vicinity.

Based on the previous information, groundwater samples will be collected during the RI at well pairs TW-15S/D, TW-16S/D, and TW-18S/D, and vertical profiling will be performed at a new well in this area (location V).

FSP.37 - Section 2.4.3 Our understanding is that the existing monitoring wells at Yard 520 also will be sampled as part of this effort, or at a minimum, these wells will be sampled at the same time by another contractor and the data used for analysis as part of this investigation. The text is ambiguous on the effort to be done in the existing wells near Yard 520. Which Yard 520 wells will be sampled? What will the analytes be for each well? Will the data be used for the RI? How are these wells sampled? Bailers? Micropurge? What field parameters will be collected? Any Yard 520 well sampling data to be used in the RI should be a part of the workplan and FSP.

Response: See response to comment G.3. Specific uses for chemical data from Yard 520 have been added to the FSP.

As part of the RI, Yard 520 wells TW-15S, TW-15D, TW-16S, TW-16D, TW-18S, and TW-18D will be sampled using the procedures specified in the FSP.

FSP.38 - Boron and molybdenum sampling will be required for all four sampling events. This comment also applies to the surface-water sampling.

Response: There was no intention to eliminate B or Mo from any sampling program. This will be clarified in the text where appropriate.

FSP.39 - Please describe an anionic surfactant?

Response: A surfactant is “a surface-acting substance”, typically soaps and detergents when considering environmental applications. Surfactants are present in many households cleaning products and are discharged with wastewater to sewer systems or subsurface septic systems. Surfactants may be used to provide an indication of the influence of septic discharges on groundwater quality. Anionic surfactants are one class of surfactants, typically including detergents and shampoos rather than soaps. They are the surfactants measured by Standard Method 5540C – Anionic Surfactants as MBAS (methylene blue active substances) as proposed in the FSP.

FSP.40 - EPA would only require that if samples from the five monitoring wells at Yard 520 with the highest concentrations of B are sampled and analyzed for Ra 226/228 and Ur and come back within 1 picoCurrie per liter of MCLs, sampling for Ra and Ur, sampling would be expanded to the finished monitoring wells in the wider ground-water system as well as for surface water, and sediment. If these samples came back more than 1 picoCurrie per liter below MCLs, no further action would be required. Gross alpha is not necessarily an accurate predictor of when a sample will exceed the MCL for Ra, which is the compound of concern. It should not be relied on as a substitute for radionuclide concentration.

Response: Analysis of gross alpha and beta activity was proposed at the request of USEPA. However, the approach can be changed as requested. The FSP has been modified to sample selected wells for the specified parameters. Evaluation of background conditions will be important in this analysis, so background wells will also be sampled.

FSP.41 - Li as an indicator of CCBs can be identified if at least some of the Yard 520 wells are sampled and analyzed for this element.

Response: The same wells to be sampled for radionuclides (see response to comment FSP.40) will be sampled for Li.

FSP.42 - The text implies, but should explicitly state, that surface-water sampling will occur at the same time as the ground-water sampling unless there is a high water event. Efforts should be made to collect surface-water samples during periods of ground-water recharge to surface water during periods of more or less normal flow (stream is not impacted by precipitation event), which can be determined from water levels in the stream and piezometers.

Response: This was the intended approach. The text will be clarified to indicate that the approach will be to complete surface and groundwater sampling concurrently and that in general, sampling will occur during baseflow conditions.

FSP.43 - Section 2.4.3, Page 2-13: Second bullet: Discontinuing sampling after one sampling event where the identified parameters are not detected is unacceptable. Seasonal variations in the groundwater could alter the concentration of these constituents in groundwater. Many

drinking water samples showed variability during the sampling that has been performed on them. A minimum of three sampling events is needed.

Response: The text has been modified to indicate that decisions about reducing the list of parameters potentially associated with CCBs will be made after the third sampling event.

FSP.44 - Section 2.4.3. The vertical distribution of contaminants in the area where a possible plume is leaving the site (NE corner of the North Landfill) needs more control than is proposed. Additional vertical profiling should be performed in this area, before the impacts of pumping by multiple domestic wells has distorted the plume significantly. An axial (plume) transect parallel to an inferred ground water flow path based on contaminant occurrence in domestic and monitoring wells and the April 2003 Groundwater Elevation Contour Map and a perpendicular transect to this flow path is generally key information to obtain in the initial phase of an RI.

Response: As noted in the response to comment FSP.4D, there are a number of well pairs on the north side of Yard 520. Sampling for the RI will be conducted at wells pairs TW-15, TW-16, and TW-18, all located at the northeast corner of Yard 520. These data coupled with the proposed vertical profiling at proposed well locations A and V (new) should be sufficient to evaluate the vertical distribution of constituents in the groundwater. Cross-sections will be prepared and will be presented in the RI Report. See comment FSP.4A.

FSP.45 - Section 2.4.4.2 Last para: Please explain when additional sediment sampling would be warranted.

Response: The FSP has been modified to include sampling of deeper sediments (see comment G.8). The sentence in question has been removed.

FSP.46 - Page 2-16: States, "Sediment samples will be taken in depositional environments, as available". Three general depositional areas should be sampled as follows: floodplain (overbank), bank deposits, and quiet reaches within the streambed. The proposed sediment sampling locations shown on Figure 2-7 appear to be uniformly distributed along Brown Ditch. The proposed sample locations should be sufficiently adjusted to allow contaminated sediment accumulation within each of these depositional areas to be representatively sampled.

Response: As discussed with the USEPA, a preliminary reconnaissance of the Brown Ditch stream channel (to be conducted prior to sampling) will identify and field-locate sampling locations (in consensus with USEPA). As part of this reconnaissance, at each sample location, candidate locations within the ditch will be identified. These sediment samples will be confined to within the Brown Ditch channel (floodplain samples will not be taken). Sediment samples may be taken from either quiet reaches or bank deposits (or a combination, based on the nature of the sediment deposit, the local flow patterns and/or other site-specific factors). This approach has been added to the revised FSP.

FSP.47 - Section 2.6–Sample the other residential well in the area south of Yard 520 that hasn't been sampled already (see figure 2-9). This sampling will help determine if there is flow beneath the ditch in response to pumping or some other influence.

Response: The other residential well on South Railroad Avenue will be included in the sampling. However, this information will not provide information about groundwater flow as the well screen interval is not known. The proposed well at location O and existing Yard 520 monitoring point MW-3A (comment FSP.33) will be used to evaluate groundwater flow in the vicinity of the ditch.

FSP.48 - Quarterly sampling is needed from at least some of these wells, especially the wells immediately south of Yard 520 and in the residential area northwest of Yard 520.

Response: The FSP includes a monitoring well network that when sampled four times over one year will provide a comprehensive picture of constituent concentrations over time and area, including areas where private wells are. Because the construction of the new monitoring wells will be known and the sampling will be completed without interferences from private well pumps and piping, the data from these wells will provide the most representative information about seasonal variability in groundwater conditions.

However, as private well data will be incorporated into the RI/FS where appropriate (see response to comments G.7 and HHRA.1), it is appropriate that these wells are sampled consistently with the monitoring wells. Therefore, the private wells will be sampled quarterly at the same time the monitoring wells are sampled.

FSP.49 - There appear to be no specifics on the tritium analysis. What is the detection limit for the tritium analysis? Determining pre- and post-1953 water requires a fairly low detection limit, so the detection limit and the time frame under consideration needs to be outlined for this to provide useful information.

Response: Specifics on the tritium analysis are included in Volume 3, The QAPP.

FSP.50 - Private Well Sampling, Page 2-20: States, "The private well sampling will focus on areas that do not have municipal water service. Figure 2-9 shows the locations of all such wells, including private wells which were previously sampled by USEPA and/or IDEM." Please clarify that few of the residential well owners inside the Town of Pines will be sampled due to the large area of municipal service.

Response: Figure 2-9 has been updated to indicate that most of the area has been supplied with municipal water service.

FSP.51 - Section 3.1.2—is it a portable, or potable, water supply (or both)? If portable, what will the water source be?

Response: The water supply should be potable. All references to a portable water supply have been corrected.

FSP.52 - Section 3.2.2— field changes must go through USEPA for approval.

Response: The text has been modified to note that the USEPA will be notified of field changes. However, most field changes are minor, and reporting these to the agency can be impractical. As discussed with the USEPA, the Respondents would appreciate working towards a more practical system of notification through the duration of the RI.

FSP.53 - Section 3.2.3.1- In order to provide useful accuracy information, GPS information should record PDOP, SNR, and number of SV's

Response: Specific requirements for GPS data are presented in Section 3.2.9 of the FSP.

FSP.54 - Section 3.2.9 In order to provide useful accuracy information, GPS information should record PDOP, SNR, and number of SV's

Response: A submeter GPS unit will be used for collecting data points that are not being surveyed by a professional land surveyor. Default values for optimum data collection will be used for data collection and have been included in the text. All associated attribute data used for data collection will be downloaded with the coordinate information.

FSP.55 - Section 3.3.2—how deep do you propose to go with shovels? 1 ft? Below the soil zone? Please clarify? What methods will be used to perform the additional inspections.

Response: Shovels will be used to get below the surface vegetation so that the underlying soils can be observed. The intention is to examine surficial soils. If the additional inspections are referring to those conducted on private property, the same procedures will be used.

FSP.56 - Section 3.3.5, Page 3-16: next to last paragraph: The text indicates that split-spoon sampling may be modified based on field conditions, such as poor recovery or running sands. There is already enough information that demonstrates that sandy soils will likely constitute a large majority of the drilling material. A contingency should be presented to cover the modifications you anticipate.

Response: According to Weaver Boos, the consultant for Yard 520, running sands may occur, and they are typically controlled by maintaining a head of water within the augers. The FSP will be modified to allow for this contingency.

FSP.57 - Section 3.3.7—Explain why a well should not be installed if the aquifer is less than 5 ft thick. Just because the aquifer is thin, or even absent, doesn't mean that important hydraulic or chemical processes aren't occurring at that location. Please provide the rationale for this decision.

Response: Although hydraulic and chemical processes may occur in the thin aquifer areas, they are not representative of conditions where the aquifer is thicker and more productive. The only monitoring well for which this may be an issue is at location R, where the surficial aquifer is believed to pinch out. This well is intended as a background well. If the saturated thickness is less than five feet, it will not provide a representative background. Text has been added to the FSP to clarify this point.

FSP.58 - Please explain the value in installing most of these wells at the water table, at least from a chemical perspective. Arbitrarily screening most of these wells at the water table, especially in the area away from Yard 520 risks missing the plume. The text seems to imply that the final depth of the monitoring wells will be based on some field decisions, including the results of vertical aquifer profiling. On the other hand, the text states wells will be set at the water table, which mandates profiling results won't be taken into consideration. It would be preferable to do the vertical aquifer profiling first, then make some determinations about the depth of screen. Please clarify this process.

Response: The purpose of performing the vertical profiling is to evaluate whether there may be concentration gradients within the surficial aquifer. Well screen intervals will be based on the results of the vertical profiling. In some cases, it may be appropriate to install well pairs. This process has been clarified in the revised FSP.

FSP.59 - Using grout and bentonite to backfill a hole may pose some problems with keeping the bentonite or grout out of the screen interval. Please specify the bottom of the grout/bentonite will be at least 1 foot below the bottom of the screen. The text states it will be to the bottom of the screen. It is also not clear if grout will be solid enough to support the weight of a well. If backfill needs to be used, bentonite pellets/chips or sand should be used.

Response: The text will be clarified to indicate that if backfill is necessary below the base of a well, bentonite pellets/chips will be used to a minimum depth of 1 foot below the bottom of the well screen. The space between the grout and the bottom of the screen will be filled with sand.

FSP.60 - Section 3.3.11—specify a minimum of two slug tests will be run per well for QAQC. Running one rising and one falling head test may not be sufficient.

Response: The protocol will be modified to indicate that the slug tests should be repeated at each well.

FSP.61 - Section 3.3.14—how will flow (and water level) measurements be made if there is ice?

Response: If a waterbody is shallow and completely frozen, there is no flow. If the waterbody is ice-covered an attempt will be made to sample it. If ice is thin, it may be possible to break up a large section of it, allow stream to clear and equilibrate (i.e., wait 10-20 minutes), and then make measurements of flow and water level. Groundwater discharge may reduce the possibility of icing over, but this is clearly dependent on local weather conditions.

FSP.62 - Section 3.3.15 [3.3.16]—Purging and parameter stabilization (with the possible exception of turbidity) are necessary for sampling using Hydropunch.

Response: Because the Hydropunch will provide screening-level data, full purging and parameter stabilization are not required as they will not affect the data quality. These procedures can be easily completed; however, it must be recognized that the useability of the data is limited to screening purposes. Detailed procedures are provided in ENSR SOP 104Pines. See also comment FSP.32.

FSP.63 - Section 3.3.15.2: p. 3-24. The draft plan states that ..."for surficial sediment samples, the bottom sediment will be excavated to a depth not more than 6 inches below the stream bed." Two samples should be taken for sediment sampling in each location. One sample, from 0-6" for human health and shallower aquatic plants and animals, and one sample 6-12", for deeper plant and aquatic animals.

Response: See response to comment G.8.

FSP.64 - Section 3.3.17—what will be the accuracy of the transducer used for the continuous monitoring (and slug testing)? Measuring changes of 0.01 ft should be possible.

Also, water levels at the monitoring points should be measured and compared to the data obtained from the transducer to ensure it's accuracy. What procedures will be used to verify the accuracy of the data? Add telemetry to at least one well and the surface-water gage so that the data can be checked daily to make sure it's accurate, being collected, and to identify any hydrologic events that may be of significance in real time—which would potentially allow you to do something about monitoring it.

Response: The transducer will be capable of measuring differences as little as 0.01 feet. Groundwater levels will be measured at three-month intervals in all wells as specified in the FSP. In addition, the transducer may be checked soon after (i.e., several days) initial installation to ensure that the data is being recorded properly. Each time a well is visited to attend to downloading data and/or

transducer set up, a water level will be recorded with a conventional water level meter. These water level readings will be checked against the transducer data to verify that the data is being recorded correctly. Adjustments to the reference elevation can be made as necessary.

It is not the objective of this FSP to evaluate short-term precipitation events in detail, nor to monitor them. If that type of data becomes important, it can be obtained in a later phase of the RI.

FSP.65 - Section 4.0—Securing property access should be initiated immediately, rather than waiting on approval of the FSP. Wholesale changes in sampling locations are unlikely.

Response: Many of the USEPA comments on the RI/FS Work Plan are related to collecting information in specific areas. Until these comments are resolved, specific sampling locations cannot be finalized. In addition, the access agreements will need to request permission from property owners for specific activities. For instance, they will specifically request access for a certain kind of work, at a certain time(s), with a certain duration and/or recurrence interval. None of this can be finalized until the work proposed in the FSP is finalized. Also, the process of requesting and obtaining access permission will be greatly facilitated by referencing a USEPA-approved work plan.

FSP.66 - Table 4-1--It would be better to do the continuous water-level monitoring sooner rather than later, right after well and gage installation. Early data collection would allow the hydraulic context of the first sampling effort to be better understood. We do not see much value in waiting 2-3 months or so after well installation to begin monitoring.

Response: Decisions on the locations for continuous monitoring will be based on collected water quality data. Therefore, the selection of the locations for continuous water level monitoring will be completed once the initial round of water quality data has been reviewed. The text has been modified to clarify this intention.

FSP.67 - Figure 2-2 is confusing. Are the proposed monitoring wells new wells? Or previously existing? Can a different symbol be used to note the locations will be sampled for radionuclides?

Response: All of the locations on Figure 2-2 are proposed new sampling locations outside the Area of Investigation. Other new sampling locations are shown on other figures included with the revised FSP. The figures have been revised using a different and/or more noticeable symbol to indicate which locations are proposed for radionuclide sampling.

FSP.68 - A stage measurement on the west branch of Brown Ditch to the west of the area of investigation should be considered.

Response: A stage measurement on the west branch of Brown Ditch in the portion of the channel indicated was considered in light of the objectives for the RI. Future studies may allow for such a measurement, but at this point, it is not required. It is possible that other parties (e.g., Weaver-Boos) will be sources for stage-level information from this section.

FSP.69 - Figure 2-6 Please clarify what locations will be monitored for what types of data. Clarify what constitutes a physical analysis. Water levels? Flow? Sediment?

Response: The location, activity, and parameter monitored have been clarified in both the text and figures.

FSP.70 - The precise water body to be monitored at the sampling site near the pond and the bend in Brown Ditch is confusing. Is this location actually on Brown Ditch? Or in some drainage from the pond? The location of the dot is a bit ambiguous. Please clarify.

Response: The location is intended to be on the West Branch of Brown Ditch (near Yard 520). It has been clarified on the revised map. The map provides general locations which will be field-identified, marked by GPS and transferred to the project GIS mapping.

FSP.71 - Figure 2-8 “Area of Ecological Habitat Assessment Pines Area of Investigation” please edit to include sampling mentioned that lies within the National Lakeshore.

Response: No ecological habitat assessment will be conducted within the IDNL, because IDNL is known to provide habitat, so its evaluation is not needed. The only sampling proposed in the FSP in the IDNL is sediment sampling in Brown Ditch, which is not related to the activity described above. While we are not doing field work to assess ecological habitat on IDNL lands, we will provide some information in the Problem Formulation section of the SERA regarding ecological habitats found there, based on available literature.

FSP.72A - SOP 101–Require recording the measuring point (typically the top of inner casing or top of outer casing) in the notebook.

Response: The SOP has been modified to add that the location of the surveyed elevation mark will be recorded in the field records.

FSP.72B - Make sure that the distance from the bottom of the probe to the 0.00 point of the tape is added to the measurement when measuring well depth. Depending on the type of measuring device, this can be important.

Response: This note has been added to SOP 101Pines.

FSP.73 - SOP 102—specify what constitutes acceptable test data (presumably a straight line on the plot) in section 7.4. Also record the type of test (rising or falling head) associated with each datafile in the test log.

Response: The SOP and text are clarified to describe what constitutes an acceptable slug test. The type of test (rising or falling) will be recorded in the slug test log, log book, and/or in the data file.

FSP.74 - SOP 103—specify that general weather conditions will be recorded. In addition, a description of conditions at the sampling site should include an assessment of channel width, whether the location is sunny or shady and has extensive in-stream vegetation.

Response: The form attached to the SOP is updated to reflect that weather conditions and general stream conditions (i.e., description/measurement of channel width, percent overhead canopy, and percent coverage by in-stream vegetation) will be recorded.

FSP.75 - How will water samples be collected if the water is too deep for wading?

Response: The text is modified to reflect the following methodology: if a mid-stream position cannot be reached due to depth or other unsafe conditions, a water sample will be taken as close to mid-stream as can be safely reach from shore or shallower depths. The sample collection number will not be affected.

FSP.76 - The sampling method describes use of a transfer bottle for those samples requiring preservative. The transfer bottle will require decontamination (section 7.2.3).

Response: The text is updated to reflect that the transfer bottle will not be re-used at different sample locations (and therefore it does not require decontamination).

FSP.77 - Some diel sampling of surface water is needed at a couple of locations, especially near Yard 520.

Response: Based on the screening-level of the SERA, this type of detailed ecological information is generally not warranted at this stage.

FSP.78 - SOP 104—the FSP calls for sampling the upper aquifer on a 5 ft interval and it is our understanding that the vertical profiling will occur before thorough geologic characterization using split spoon sampling. Please describe how you will know when you're in the underlying clay?

Response: Depending on the specific technology used, continuous coring (direct push) may be completed during the vertical profiling. A visual inspection of each core will be made to characterize

the sub-surface geology, including the contact with the underlying clay. However, there is technology that allows for placement of groundwater sampling ports without continuous coring. In such cases, the presence of clay will be determined by feedback from the operators (e.g., change in resistance or downward pressure) and the lack of water yield from the sampling port.

FSP.79 - Again, measure a full list of field parameters.

Response: (See also comment FSP.32.) Because the Hydropunch will provide screening-level data, full purging and parameter stabilization are not required as they will not affect the data quality. The Hydropunches are wellpoints installed temporarily without sand pack or well development. Therefore, data from them is suitable only for screening purposes as they may not be representative of the aquifer conditions and/or what would be expected from a properly constructed and developed monitoring well. The field parameters can be readily collected; however, it must be recognized that the useability of the data is limited to screening purposes. The SOP will be modified to include all field parameters.

FSP.80 - Section 7.2.5—a minimum of three well volumes should be purged prior to sampling, not just one.

Response: As noted in FSP.79 and FSP.62 above, purging of three well volumes is unlikely to improve data quality significantly for this screening-level data. However, because well yields are expected to be relatively high, purging three well volumes can easily be performed. The SOP will be modified to include a three-volume purge.

FSP.81 - Section 7.2.8—use a bladder pump for purging and sampling if the water is too deep for a peristaltic pump. It would disturb the water column less.

Response: Hydropunches and other temporary wells are typically of very small diameter that would preclude the use of a bladder pump.

FSP.82 - SOP 106—how will flow rate be estimated? Time to fill a bucket? Guess?

Response: The text will be clarified to indicate that a flow rate cup will be used to measure the flow rate.

FSP.83 - Measure field parameters during the purging process to determine if they have stabilized prior to sampling. Parameter stabilization is necessary for sampling, depending on the sampling goals. Goals for this sampling should require stabilization of field parameters prior to sampling.

Response: To meet the objectives of sampling private wells, it is not necessary to ensure that parameters have stabilized. AOC II requires sampling of private wells to obtain additional information

on potential exposures. Therefore, the purpose of this sampling is not to characterize groundwater in the (often unknown) formation in which the well is screened. So while the piping will be flushed prior to sampling, formal purging is not needed.

FSP.84 - Measure field parameters in a flow-through cell for greater accuracy. Parts of the text indicate a flow-through cell will be used and parts of the text indicate one won't. Please clarify.

Response: A flow-through cell will be used to measure field parameters when sampling monitoring wells. It will not be used when sampling private wells. The text has been clarified.

FSP.85 - SOP 7221--The volume of water added during drilling, split spooning, or well construction should be recorded and three times that volume should be removed during purging. If for some reason that number can't be recorded, at least 20 well volumes should be purged from the well. Given that a 2 inch well has less than 2 gallons in a 10 foot water column, 10 volumes would be less than 20 gallons. This is a minimum purge effort.

Response: The SOP will be modified as requested.

FSP.86 - SOP 7600--Pump decontamination description (section 7.3) consists of pumping 1 gallon of soapy water through the tube. This is inadequate. At a minimum, after soapy water, then pump tap water and finally distilled water through the tubing. The volume can depend somewhat on the type of pump--relatively little for peristaltic pump, more for bladder pump, still more for Grundfoss pump. Please revise.

Response: The pump tubing will be disposed of after sampling each well, so it will not require decontamination. The SOP has been modified to be more clear and to allow alternatives if the tubing is re-used.

FSP.87 [moved from ERA.34] - Comment 16: SOP 109 Figure 1 ENSR Boring Log; Suggest limiting each single page to a maximum 10 foot logging interval to ensure adequate space to accommodate recommended information for inclusion by IDEM Technical Guidance Document.

Response: The boring log format will be changed to show 10 feet on each page.

RI/FS Work Plan - Volume 3, QAPP

QAPP.1 - Town of Pines RI/FS QAPP Section A7.2 Data Quality Objectives for Measurement Data states that the objectives for field precision Relative Percent Difference (RPDs) are 30% RPD for aqueous duplicates sample and 50% RPD for solid duplicate samples. These RPDs are too large and should be reduced to 25% RPD for aqueous duplicates sample and 30% RPD for solid duplicate samples.

Response: The RPDs will be modified as requested by USEPA.

QAPP.2 - Town of Pines RI/FS QAPP Section 1.0 Surface Water and Sediment Samples, Subsection 8.4 Sample Labels states that the project name or number will be on the sample labels. The site name should not be placed on samples because the laboratory may have business interest with other clients involved with the same site and this could create a conflict of interest. It would be better to use the project number and do nothing to let the laboratory know the site name.

Response: The project number, rather than the project name, will be used on the sample labels, per USEPA's request.

QAPP.3 - All Field Duplicates should be taken from sampled matrix with contamination or from locations that have had contamination in the past. In part, Field Duplicates are used to measure analytical precision and this requires analytes with measurable concentrations.

Response: Field duplicates will be collected at locations where detectable concentrations of target analytes are expected.

QAPP.4 - Table A-2--it appears mercury is not to be included in these analyses. As mercury is a CCB, it should be added to the list of analytes.

Response: Mercury is not a CCB, nor is it a major component in CCBs. As summarized in the Site Management Strategy, published literature indicates that concentrations of mercury in CCBs are low. Mercury is being analyzed in the suspected CCB samples collected under the MWSE SAP. The results from these samples indicate that mercury concentrations are low. As discussed with USEPA, three samples of CCBs from the Type II (North) Area at Yard 520 will be analyzed for TAL metals. If concentrations of mercury in those samples are significantly greater (i.e., levels of concern) than in the suspected CCBs outside Yard 520, mercury will be added to the initial parameter list for the RI/FS.

QAPP.5 - Again, consider swapping Ur and Ra for gross alpha and gross beta, or put in a contingency for these analytes based on the gross alpha and gross beta concentrations.

Response: Gross alpha and beta radioactivity will be replaced with radioactive isotopes of uranium and radium as requested. (See FSP.40)

QAPP.6 - Table A-4--a detection limit of 700 pCi/L for tritium is too high to be of any value to this investigation. The detection limit should be on the order of 2.5 pCi/L.

Response: Neither the lab nor its subcontractors can achieve the require detection limit. The Respondents are in the process of evaluating alternate laboratories. The QA information about this analysis will be provided in an addendum to the QAPP when it is available.

The following additional comments on the QAPP were received from USEPA in a memorandum by Warren Layne on April 4, 2005.

With this memorandum I am conditionally approving the Quality Assurance Project Plan (QAPP) for the Pines Area of Investigation with some reservations which must be resolved prior to final approval.

QAPP.7 - 1. Include Warren Layne Quality Assurance Plan Reviewer on the signature page.

Response: Warren Layne is already included on the signature page. His title will be changed as requested.

QAPP.8 - 2. Section A Revision 0 Page 16 of 24, optimizing the study design. Please add to the last element of the table: If the target risk levels are exceeded, then the EPA RPM will be consulted and a decision rule based upon a more formal statistical design will be developed.

Response: If the results of human health and ecological risk assessments indicate that target risk levels are exceeded, remedial actions will be evaluated in the FS. As specified in AOC II and consistent with standard USEPA guidance, the FS includes identification of Remedial Action Objectives, development and screening of remedial alternatives, and detailed evaluation of alternatives. If additional sampling is needed to support the FS process, it will be determined at that time. Text has been added to this step of the DQO process to allow flexibility for statistical-based sampling in the future.

QAPP.9 - 3. Section. Revision 0 page 14 of 14. There should be a methodology incorporated into the data base to allow for inclusion and storage of data validation narratives, otherwise the meaning of qualifiers associated with the data will be lost.

Response: The EQulS database includes a standard table that defines the data validation qualifiers, so their meaning will not be lost.

QAPP.10 - 4. Why is mercury absent form the target analyte list when it is a well known constituent of coal products and mercuric salts could easily be present in the sediment.

Response: See response to comment QAPP.4.

QAPP.11 - Standard Operating Procedure Remarks and comments that must be addressed in the QAPP prior to final approval. The HydoPunch Groundwater Sampler referred to in AOP Number 104Pines, may require a very long time to use as a sampler sure to the narrow diameter of the hydropunch tube. Please address the rational for the use of such a narrow devise and present proof that the sampling planned with this device is practical.

Response: HydroPunch technology has been used for collecting screening-level groundwater data for many years with no problems due to tube diameter. It is not the tube diameter that affects sampling time, but the yield of the formation and/or effectiveness of the sampling device (e.g., pump). The predominant geologic material beneath the Pines Area of Investigation is sand with a relatively high permeability and good yield. Where a peristaltic pump can be used for sampling, the sampling time should not be excessive. Where water depths are too great for a peristaltic pump and bailers are used, sampling times are expected to be greater, but still feasible (i.e., sampling should take less time than it would from a typical monitoring well in a low-permeability formation).

QAPP.12 - Laboratory Reporting Levels for Inorganics (replace with Inorganic Compounds, Inorganics is not a word.) One of the Practical Quantitation Limits (PQL) are higher than one would expect for inorganic analysis in a soil matrix. Thus: The PQL for Selenium is reported as 20 mg/kg when one would expect a value of 3.5 mg/kg; whereas several of the listed metals seem to have unusually low PQLs; for example Aluminum has a PQL ½ of the expected value, and Barium and Cadmium are almost too good to be true with values for the PQL of 1/10 the expected PQL. How realistic are these reported PQLs to the CCB samples you intend to collect? Does the lab have previous experience measuring inorganic compounds in CCBS matrixes?

Response: The PQLs have been corrected and/or updated in the revised QAPP. The laboratory has been analyzing CCB samples collected under the MWSE SAP.

QAPP.13 - The laboratory schedule table should be here in the QAPP.

Response: The laboratory schedule will be provided.

QAPP.14 - SOP No. MET-6010BPINES. Even though the actual detection limits for this method are sample dependent and may vary as the sample matrix varies some of the “Typical IDLs” presented in Table 1 seem excessively high. These are presented below. I suggest a different

method that is more sensitive such as ICP-AES or ICP-MS be used in these cases if the lab is incapable of .

Analyte	Typical IDL from Table 1 µg/L	Expected Typical IDL for Method SW-846 6010B µg/L
Boron	37.3	3.8
Iron	44.1	4.1
Silicon	68.7	17 as SiO ₂ or
Barium	12.2	0.87
Lithium	23.9	2.8

Response: The IDLs have been updated in the revised QAPP. Where appropriate, alternative laboratory methods have been considered.

RI/FS Work Plan - Volume 4, Health and Safety Plan

HASP.1 - Section 5.2.3.1 Drilling Hazards - Conventional Drilling. The use of ANSI approved fall protection is mentioned and includes a reference to use of "approved belts". If fall protection is to be used, serious consideration should be given to the use of a full body harness rather than belts.

Response: The text has been modified to include harnesses.

HASP.2 - Section 5.2.5.1 Excavation Hazards - Working Around Operating Machinery. It is suggested that personnel working in the vicinity of the excavation activities be equipped with high visibility safety vests (either high visibility green or orange). This will allow the operator to more easily see workers in vulnerable positions.

Response: The text has been modified to include high visibility vests.

HASP.3 - Section 7.1 Protective measures - Protective Clothing and Equipment

The use of the following PPE is described in the plan but the PPE is not listed in the Section 7.1 list of required PPE:

- * Tyvek? Coveralls - Generally offering excellent protection from particulate exposure, but minimal splash protection from liquids.
- * Fall Protection
- * Leather or KevlarTM Gloves
- * Insect Repellant w/ DEET
- * TecNu Poison? Oak-n-Ivy Cleanser
- * Eye Wash mentioned in Section 12.5.
- * First Aid Kits listed in Appendix F

Response: The additional PPE has been added to the list in Section 7.1.

HASP.4 - The contractor lists 'Safety glasses with side shields (ANSI Z 87.1)'. The ANSI standard has been updated and protective eyewear should comply with ANSI Z 87.1-2003.

Response: The updated standard has been cited.

HASP.5 - In Section 5.1.1.2, the contractor has described the primary route of exposure to CCB-derived constituents as contact with groundwater and surface water. While less expensive, latex gloves offer very limited chemical protection and can offer a false sense of

security to users. It is suggested that the contractor eliminate the use of latex gloves from the list of proposed PPE in favor of nitrile? or other similar protective gloves.

Response: Latex gloves have been removed from the list of PPE in Section 7.1.

HASP.6 - Section 7.2 Protective Measures - Respiratory Protection. All respiratory protective equipment (APRs and HEPA cartridges) should be NIOSH approved.

Response: A note has been added to Section 7.2 that indicates respiratory equipment should be NIOSH approved.

RI/FS Work Plan - Volume 5, Human Health Risk Assessment

HHRA.1 - Section 3.1–Some private well sampling must be incorporated into the risk assessment. This well-established and probably most important pathway cannot be ignored. Chose sample locations and do appropriate analyses (tritium for example) and sampling procedures to clarify unknowns.

Response: Private drinking water wells will be sampled as part of the RI. Data obtained in the RI will be used in the HHRA only if the following conditions are met:

1. The screened interval is documented in drillers' records and/or the IDNR database;
2. The well is screened in the surficial aquifer;
3. The water quality in the well does not appear to be impacted by septic systems or other sources; and
4. Only CCB-derived constituents detected in the wells will be evaluated.

Where private well data collected in the RI are determined to be appropriate for use in the HHRA, the data will be evaluated in combination with groundwater data collected from monitoring wells.

Section 3.1 has been revised to reflect this.

HHRA.2 - Section 3.2– The soil, CCB, and sediment data should at least be tested to determine if the distribution of the concentrations can be analyzed using parametric methods. Some of this was to be done on the soils and CCBs as part of other work plans. Once the nature of the distribution is known, the appropriateness of much of the suggestions in this section can be determined. For example, it may be possible to use statistical methods to estimate concentration distributions below the detection limit, rather than assume a value which is ½ the detection limit.

Response: As indicated in Section 5.5.1, the data distribution will be determined in order to calculate 95% Upper Confidence Limits (UCLs). Following USEPA guidance, parametric methods will be used to derive the UCLs to the extent possible (i.e., where appropriate based on the data distribution. For datasets where a distribution cannot be defined, nonparametric methods will be used to derive UCLs. The minimum, maximum, and average detected concentrations will be presented regardless of data distribution in order to show the range of detections, in accordance with standard USEPA procedures. Alternative methods for estimating concentration distributions below detection limits may be considered; however, it should be noted that this may impact the schedule for completion of the HHRA. These alternatives have been added to Section 3.2.

HHRA.3 - Please clarify what is meant by “summary statistics will not be calculated that are not detected in a particular area/medium.”. There may be some instances where an analysis is warranted of non-detects grouped within a larger sample set of detects, ex. analysis relating to the spatial distribution of B in soils or something along those lines.

Response: In a given sample grouping for the risk assessment, if a constituent is never detected, summary statistics will not be calculated, consistent with standard USEPA risk assessment procedures. If a group of non-detects were grouped within a larger sample of detects, all sample results, including the non-detects, would be included in the summary statistics. The statement was meant to clarify that for sample groupings with no detects of a given constituent, the constituent will be assumed to be not detected. The text has been modified to clarify this point.

HHRA.4 - Section 3.3.1—A large number of compounds that are “essential nutrients” that are also toxic, depending on the dose? Clarify what is an “essential nutrient”?

Response: A separate section (3.3.4) has been added to discuss essential nutrients in more detail. As stated in that section, essential nutrients are defined as calcium, iron, magnesium, sodium, and potassium, as listed in USEPA’s Risk Assessment Guidance for Superfund, Volume I Human Health Evaluation Manual, Part A (EPA/540/1-89/002, December 1989) page 5-23. As recommended in the aforementioned guidance document, these essential nutrients will be included in the background evaluation to further support their elimination based on essentiality. If essential nutrient concentrations are not representative of background, the essential nutrient concentrations will be further evaluated based on dietary levels and requirements and a weight of evidence approach to further support whether they should be excluded from the HHRA based on essentiality.

HHRA.5 - Section 3.3.2—Twice the arithmetic mean of background should not necessarily represent a hard and fast starting point. If a compound is detected above health based levels and an appropriate statistical analysis (analysis of variance, outlier test, etc.) indicates the level is unlikely to be the result of “background” presence, the compound should be considered a COC, even if present at less than twice the average background level.

Response: The comparison to background is now presented in Section 3.3.3. A more statistically rigorous method for determining whether a constituent is consistent with background will be employed for constituents with concentrations above health based levels. If it is determined by this method that a constituent concentration is consistent with background, the constituent will be eliminated from further consideration in the risk assessment. It should be noted that the addition of this more detailed statistical background evaluation will impact the schedule for completion of the HHRA.

HHRA.6 – Section 3.3.2 2nd para, 5th line: How is “in an area” defined? Does this mean the site area or some gridded subsection of the site area?

Response: Exposure areas may be identified for the human health risk assessment based on the results of the field sampling and other RI data as well as a consideration of human activities within the Area of Investigation. The analytical results may indicate distinct areas that should be evaluated separately based on the types of material identified or reasonably expected exposures. A statement to this effect has been added to the text in Section 3.2.

HHRA.7 - Section 5.1.1, 2nd para: Please edit to read “Because the shallow aquifer may be the only aquifer potentially affected by CCB’s, once that determination has been made, only the shallow groundwater aquifer will be evaluated in the HHRA.”

Response: The requested change has been made.

HHRA.8 - Section 5.2.1, 1st para. 9th line: Please check census data before assuming 24 years residency.

Response: The period of residency is actually assumed to be 30 years, with 6 years of childhood exposure and 24 years of adulthood exposure. This is a standard assumption in human health risk assessment defined in Standard Default Exposure Factors (OSWER 9285.6-03, March 1991). The Exposure Factors Handbook (EPA/600/P-95/002, August 1997) also lists 30 years as the 95th percentile for residence time. The residency period in these documents was determined based on a 1993 U.S. Bureau of the Census (USBOC) report of a 1991 American housing survey (American Housing Survey for the United States in 1991). According to the Exposure Factors Handbook, census data provide information regarding population mobility, but it is difficult to determine average residence time from this information (USEPA, 1997a). The 95th percentile value of 30 years provided in the Exposure Factors Handbook is therefore the most appropriate estimate of residency. In addition, the use of this value will be consistent with USEPA recommendations for residential risk assessment.

HHRA.9 - Section 5.3.1– Standard U.S. EPA value for considering weather-limited exposure is 250 days. Please use that number. References for both Sheehan et. al. 1991, and USEPA, 1989a are missing from the references list. In addition, weather stations are located at the Gary Airport and Ogden Dunes. Were these rejected?

Response: Since the submittal of the RI/FS Work Plan in January 2005, temperature data have been obtained from the Michigan City Generating Station. Using the Michigan City temperature data, more recent South Bend precipitation data, and the same process as described in Section 5.3.1, an exposure frequency of roughly 250 days per year is calculated. Therefore, an exposure frequency of 250 days per year will be used in the human health risk assessment for the reasonable maximum exposure (RME) residential scenario, which will be supported by the temperature data from the Michigan City Generating Station and the precipitation data from South Bend. The meteorological factor is also used to derive the central tendency exposure (CTE) exposure frequency of 165 days per year. Section 5.3.1 has been updated to reflect the new data. We are not aware of a USEPA

reference for weather-limited exposure; if that reference is supplied by USEPA, it will be included as further support for the exposure frequency.

References for both Sheehan et al., 1991, and USEPA, 1989, appear on page 8-2 of the work plan.

The weather stations listed above were evaluated. Gary Airport has an automated weather station (ASOS) and records hourly wind and temperature data, but not precipitation. Data capture is about 50% of what is available from the South Bend station. Therefore, this station was not used in the evaluation. There are daily National Climatic Data Center (NCDC) summaries of temperature and precipitation for Ogden Dunes. However, these are available only through 1988. Because more recent data is available from other sources, the Ogden Dunes data were not employed.

HHRA.10 - Section 5.3.3 2nd Para: Seems to actually be from Section 5.3.2

Response: This paragraph does belong where it appears in Section 5.3.3. The paragraph introduces the soil-to-skin adherence data, which are used to estimate the amount of soil adhering to the skin that may be ingested by hand-to-mouth contact. The text has been revised to make this more clear.

HHRA.11 - Section 6.2 Middle of pg. 6-2. Please edit to read "A cumulative target risk level of 10^{-6} will also be used as an initial level to evaluate the risk assessment results. If remedial action is determined to be necessary, site specific information may result in a revision of the target risk level."

Response: USEPA states in *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions* (OSWER Directive #9355.0-30, April 1991) that:

"Where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4} , and the non-carcinogenic hazard quotient is less than 1, action generally is not warranted, unless there are adverse environmental impacts."

The Statement of Work (SOW) for the Area of Investigation indicates that the HHRA will be conducted in accordance with several USEPA guidance documents, including the aforementioned document. Based on the document, remedial actions will not be recommended where the cumulative risk is less than 10^{-4} . Therefore, using a target risk level of 10^{-6} to initially evaluate the risk assessment results is not warranted and may result in unnecessary confusion regarding the conclusions of the HHRA. Therefore, the suggested change will not be made. All results will be presented clearly in the tables supporting the HHRA, which will allow the reader to easily identify potential risks at any level.

RI/FS Work Plan - Volume 6, Ecological Risk Assessment

ERA.1 - Section 1.1 : p. 1-2 Delete the “s” from “Parks”

Response: The document has been revised as suggested.

ERA.2 - Section 1.1.2; Ecological risk information, including surface water and sediment data, from the Yard 520 Retention Area should be included in the SERA.

Response: The stormwater retention area in Yard 520 is a man-made detention area for collection and treatment of stormwater runoff. It is subject to operation and closure requirements. The results from the surface water and sediment sampling and associated ecological risk will be estimated for this area in terms of assessing its potential as an attractive nuisance and the risk results included in the SERA.

ERA.3 - Section 1.2.1, 1st para: There is no reason to remove the Yard 520 stormwater retention area from the SERA.

Response: See response to comment ERA.2 above.

ERA.4 - Section 1.2.1, 2.2.1; Since the Brown and Kintzle ditch systems have historically been maintained for drainage, they have likely undergone periodic dredging. It is important to determine where the dredge spoil has been placed and sample those areas for CCBs, if appropriate. A common location for dredge spoil disposal is on the banks of a ditch.

Response: The history of the area indicates that the West Branch of Brown Ditch was recently created (1980s) and therefore the excavated material there would not reflect the presence of historical sediments. The deepening of the East Branch in 1982 may have resulted in some historic dredge material which may be considered for sampling if identifiable in the field. This identification of historic dredge spoil will be a task for the reconnaissance of the Brown Ditch stream channel, which will be conducted with USEPA personnel.

ERA.5 - Section 1.2.2; Ecological habitat can occur in residential areas and street margins. These areas cannot be excluded from evaluation unless no wildlife habitat exists.

Response: We acknowledge the potential for wildlife to occur in close proximity to human dwellings but wish to be prudent regarding designation of any vegetated area as ecological habitat for purposes of the SERA. The overlap of wildlife activities in residential neighborhoods may be a common occurrence in some areas, but caution needs to be used in interpretation of what may be marginal co-existence or transient behavior, particularly where much higher quality habitat may abut such areas.

Based on discussion with USEPA (5/10/05 with Ed Karecki and 5/12/05 with Tim Drexler), criteria have been developed for identification of ecological habitat in areas where CCBs may be present.

Ecological habitat will be identified through the following criteria:

- Minimum size of 1 acre of undeveloped land (see Attachment A for comparison of habitat size with typical range of ecological receptors to be considered in SERA);
- Low level of disturbance based on land use (not lawns, maintained areas, or storage areas);
- Distance or proximity to major roadways; and
- Level of vegetative cover (>50%) or estimate of habitat quality.

If appropriate, further refinement of these criteria will be presented in a Work Plan addendum.

ERA.6 - Section 1.4.1; The surficial CCBs exposure pathway should be evaluated in the SERA.

Response: The surficial CCBs exposure pathway is currently scheduled to be evaluated in the SERA during a latter phase, as appropriate, once initial information about the chemistry and locations of suspected CCBs has been collected.

ERA.7 - Section 2.2.3; Soils evaluation should include CCBs within 5 feet of the surface.

Response: There is no consensus from USEPA guidance or elsewhere regarding the most appropriate depth for sampling to address ecological concerns (see Attachment B for list of sampling depth for various state programs regarding ecological risk). While it is likely that CCBs may be variable in depth, it is anticipated from preliminary investigations that the nature and composition would be relatively homogeneous.

Based on discussion with USEPA (5/10/05 with Ed Karecki and 5/12/05 with Tim Drexler), we have tentatively agreed to sample soil at two depths – a surficial sample taken from 0 to 6 inches and a deep composite from 6 inches (0.5 ft) to 5 ft. Should it be appropriate to conduct additional sampling, further refinement of the soil sampling strategy will be presented in a Work Plan addendum.

ERA.8 - Section 2.2.4.1 : p. 2-4; The statement that “...it is important to note that most of these endangered species [special vegetation] are found within the western portions of the IDNL and not within the eastern most section (i.e., the area adjacent to the Pines Area of Investigation)...” leaves the impression that there no “special vegetation” floristic elements in the East Unit. The areas within the National Lakeshore adjacent to the Pines Site have had relatively little

vegetation or wildlife survey work done. However, even with limited surveys and obvious degradation (e.g., draining by Brown Ditch), Wilhelm (1990) identified 48 special vegetation floristic elements from this area. Please revise.

Response: The document has been revised to indicate the presence of special vegetation floristic elements in the IDNL.

ERA.9 - Section 2.3.3; An explanation needs to be provided for why ecological habitat identification will focus on the areas between Second Place and the northern border of the EB of Brown Ditch.

Response: An explanation will be provided. This is the area where the limits of suspected CCBs will be compared to the presence and overlap of ecological habitats to better evaluate potential exposure areas and levels. See also response to comment ERA.5.

ERA.10 - Residential Areas and transportation right of ways can not be excluded from evaluation unless no wildlife habitat is present.

Response: See response to comment ERA.5.

ERA.11 - Section 2.4; In a SERA it is not appropriate to exclude COPECs based on background levels or frequency of detection. These are tools used in the risk management stage.

Response: We maintain the exclusion of COPECs based on background or FOD is part of the risk assessment process and does not occur at the risk management stage (i.e., Stage 8 of the Superfund ERAG guidance). We do not feel it is appropriate to carry forth COPECs that are consistent with regional background levels, but that they should be identified and eliminated, as warranted, in the risk assessment process. Discussion with USEPA (Ed Karecki on 5/10/05) indicated consensus on this last point.

Based on our past ecological risk assessment experience, it has been considered appropriate and advisable to evaluate the concentration of inorganic constituents in site samples relative to concentrations in off-site reference areas, as long as sufficient, representative background media samples are available. While such a comparison should not be used to initially screen out such constituents at a preliminary stage in the SERA, it would be appropriate to consider background levels in the Uncertainty Section, and when gaging the level of CCB-related risk as part of the interpretation of the Risk Results.

Based on this analysis and a discussion in the Uncertainty Section and risk interpretation, we will evaluate the remaining COPECs and either propose to eliminate them from further consideration or carry them on for further investigation in the BERA process. This refinement of COPECs is consistent

with the overall tiered approach to ecological risk assessment via the SERA, BERA, DERA sequence, which is set forth in USEPA Region 5 guidance.

ERA.12 - Section 2.4.3 : p. 2-14; As previously mentioned, a single contractor for all monitoring well sampling would help to ensure consistency of methodologies and applied QA/QC for best comparison of results (at least for a minimum of two sampling rounds).

Response: [This comment refers to the FSP.] It is intended to use the USEPA approved contractor (ENSR) to conduct the sampling at the Pines Area of Investigation to the greatest extent feasible. See response to comment G.3.

ERA.13 - Table 2-1 Proposed Sampling Programs; Metals analysis of CCBs for the Yard 520 sampling should not be excluded in order to understand what contaminants are leached in the upper strata/intervals and concentrated or precipitated out in the lower layers or upon reaching the water table. Boron may behave in this manner if the CCB is sufficiently basic to form the mineral phase ettringite.

Response: [This comment refers to the FSP.] The objective of the Yard 520 SAP is to address the possible presence of certain parameter groups (dioxins/furans, PAHs, radionuclides) in CCBs in the Pines Area of Investigation. Samples of suspected CCBs outside Yard 520, and samples from the Type II (North) Area at Yard 520 are being analyzed for metals.

ERA.14 - Table 2-1 needs two other rows of samples replacing at least in part samples planned from the south landfill:

Yard 520 (North Landfill) CCBs, Metals, PAHs, PCDDs/PCDFs, Rad (solids)

Yard 520 (North Landfill) Groundwater, Metals, Other Inorganics (sulfur), surfactants DOC, field parameters

Response: [This comment refers to the FSP.] Sampling from the Type II North Area of Yard 520 is not needed to meet the objectives of the Yard 520 SAP. See responses to comments G.2. However, Table 2-1 has been updated to include sampling in the Type II (North) Area under the FSP.

ERA.15 - Section 3.1.1, middle of pg. 3-2. Explain how depth of biological activity will be determined?

Response: Based on the discussion of surficial soil sampling depths and tentative agreement to two samples within the 0 to 5 ft strata (see comment ERA.7), there is no need to determine biological activity in the soil layer. This reference has been dropped from the Workplan.

ERA.16 - Fish tissue concentration estimates should also be calculated based on sediment data.

Response: Based on discussion with USEPA (Ed Karecki on 5/10/05) we will use biota-sediment accumulation factors (BSAFs) for estimation of fish tissue concentrations where possible but will default to bioaccumulation factors (BAFs) for constituents for which no BSAF is available.

ERA.17 - Comparison of soils to background levels is a risk management decision and is not appropriate for the SERA.

Response: See response to comment ERA.11 above.

ERA.18 - Sections 3.1.3, 3.1.4, 3.1.5, 3.1.6.1, 3.1.6.2, 3.1.6.3; In a SERA it is not appropriate to exclude COEPCs based on background levels or frequency of detection. These are tools used in the risk management stage.

Response: See response to comment ERA.11 above.

ERA.19 - Section 3.1.5: p. 3-3; The plan states that "...if maximum concentrations of constituents in an area are found to be less than two times the average background concentrations, then those constituents can be eliminated from quantitative evaluation in the risk assessment." However, it does not explain what steps will be taken to ensure that the background samples are truly representative of background levels.

Response: Details on the background sample collection criteria and procedures are provided in the Yard 520 SAP.

ERA.20 - Section 3.1.6.1—this section states that Hg will be among the compounds evaluated. However, my reading of the other documents, especially the QAPP and the FSP, indicates that Hg will not be included in any analysis performed for the RI investigation. Please clarify.

Response: The suspected CCB samples collected under the MWSE SAP and three samples of CCBs from the Yard 520 Type II (North) Area are being analyzed for Hg under the FSP. As summarized in the Site Management Strategy, Hg is not an important component of CCBs. This is supported by the analytical data on the suspected CCBs samples already collected.

ERA.21 - Section 3.1.6.2—per comments on the Human Health Risk Assessment, twice the average background concentration should not be a default starting point for COPEC evaluation.

Response: See response to comment ERA.11 above and HHRA.5. A more detailed background comparison process has been added to the ERA Work Plan in Section 3.2.3.

ERA.22 - Screening benchmarks are not appropriate for screening bioaccumulative chemicals, unless a value which is protective of upper trophic level receptors has been calculated.

Response: Screening benchmarks from Region 5 will be used for parameters, as available, and those based on protection of upper trophic level receptors noted. For those parameters where wildlife-based criteria are not available, further investigation and use of food web models for evaluation may be appropriate. It is proposed that the list of bioaccumulative chemicals of concern (BCCs) contained in the Great Lake Water Quality Initiative (GLWQI) be used as reference for identifying bioaccumulative chemicals and/or the use of a BAF greater than 1000 as a criterion for inclusion. Current BCCs are listed in 40 CFR 132.6 Table 6 (relating to pollutants of initial focus in the GLWQI).

ERA.23 - Section 3.2; Conservative assumptions, including most sensitive life stage data, should be used.

Response: Conservative assumptions (i.e., NOAEL-based TRVs, 100% area use factor, exposure duration of 1) have been incorporated into the evaluation of wildlife exposure.

ERA.24 - Table 3-1; Please provide a rationale for why some locations are sampled 4 times per year and other 2 times per year.

Response: Surface water measurements and water samples are to be taken 4 times over a one-year period. The work plan has been corrected.

ERA.25 - Table 3-2—do the benthic invertebrates include any molluscs? These organisms are susceptible to contamination. If they are not to be sampled, why not?

Response: In general, the benchmarks identified for the evaluation of the benthic invertebrate community are more likely to be based on benthic invertebrates used in toxicity testing, like *Chironomus* or *Hyalella*, than molluscs (snails, freshwater clams, etc). This is because the former are more sensitive to water and sediment quality concerns than the latter. These results will be used to indicate the potential for direct effects on the benthic invertebrate community. Benthic invertebrates will be modeled as prey items in the food web model and some bioconcentration factors used in this evaluation may be based on molluscs. Specific sampling of molluscs is not planned.

ERA.26 - Least shrew should be added. Little brown bats consume mostly aquatic insects.

Response: The least shrew will be added as an additional receptor.

ERA.27 - A vermivorous mammal such as the least shrew should be added to the receptor list.

Response: The least shrew will be added as an additional receptor.

ERA.28 - Section 3.2.3; In a SERA a 100% area use factor and exposure duration should be used.

Response: The initial assessment will use 100% AUF and exposure duration for conservative estimates. However, alternative area use factors and exposure durations and corresponding risk levels may be discussed in the uncertainty section.

ERA.29 - Section 3.3.2; The TRV criterion bullet point regarding potential population or community effects should be removed.

Response: The text has been modified as suggested.

ERA.30 - For mammalian species a body scaling factor of 1 should be used.

Response: Agreed, alternative scaling factors may be discussed in the uncertainty section.

ERA.31 - Table 3-3; The diet of each receptor should consist of 100% of the most contaminated food item, adjusted for soil ingestion. The diet for shrew and robin should consist of earthworms plus soil ingestion, since they represent the vermivorous receptor pathway.

Response: The dietary distributions currently presented in Table 3-3 generally represent diets based on scientific studies (mostly derived from Wildlife Exposure Factors Handbook (U.S. EPA, 1993)). The diets of carnivores, insectivores, and herbivores will be revised to represent 'exclusive' diets consisting of entirely one prey item. The diets of omnivores (by definition a receptor that has a mixture of plant and animal foodstuffs) will remain as indicated in Table 3-3 to reflect the mixed diets described in Table 3-2.

ERA.32 - Woodcock soil consumption (10.4%) should be used for the robin, or substitute the woodcock as the vermivorous bird. The Canada goose soil ingestion should be 8.2%. Raccoon soil ingestion should be 9.4%. Meadow vole soil ingestion can be 2.4%. Use mourning dove for grit consumption estimate. Revise all "professional judgement" estimates using scientific references.

Response: The inadvertent soil consumption rates will be reviewed and updated to reflect additional scientific references, as appropriate.

ERA.33 - Section 4.3; A discussion of the potential for additive and synergistic effects should be added here.

Response: Additive and synergistic effects of COPECs will be added as a topic of discussion for the uncertainty section.

ERA.34 - Comment 16: SOP 109 Figure 1 ENSR Boring Log; Suggest limiting each single page to a maximum 10 foot logging interval to ensure adequate space to accommodate recommended information for inclusion by IDEM Technical Guidance Document.

Response: We concur with this comment but this comment has been moved to the end of the comments on the FSP (FSP.87) as it is applicable to that document.

RI/FS Work Plan - Volume 7, Quality Management Plan

COMMENTS DATED FEBRUARY 24, 2005

Management and Organization, Section 2

QMP.1 - The QMP plan shall describe the system applicable to the organization (ENSR) overall, not only applicable to the project. The ENSR should submit the document, which will be applicable to all environmental projects. The submitted document must be signed by senior management and QA manager of ENSR. The project managers and project QA managers signatures should be included in addition to the senior management signatures.

Response: As discussed in a conference call with USEPA Region 5 on April 7, 2005, ENSR is submitting its corporate Quality Program Manual as Appendix A to the Quality Management Plan (QMP) for the Pines Area of Investigation. The corporate plan discusses the quality systems applicable to ENSR, and is signed by ENSR's senior management and Quality Assurance (QA) Manager. Elements of ENSR's corporate plan have been referenced as necessary in the QMP for the Pines Area of Investigation.

QMP.2 - The discussion of technical activities or programs which require quality management should be included in this section.

Response: A list of several technical activities and programs that require quality management has been added to Section 2.0 of the revised QMP for the Pines Area of Investigation.

QMP.3 - A discussion of how management will assure that applicable elements of and criteria for the quality system are understood by managers and staff, and implemented in all environmental programs should be provided.

Response: ENSR's corporate Quality Program Manual discusses how its management will assure that applicable elements of and criteria for the quality system are understood by managers and staff, and implemented in its environmental programs. This document has been referenced in Section 1.0, and other sections of the document as necessary, and included in the revised QMP for the Pines Area of Investigation as Appendix A.

Quality System Components, Section 3

QMP.4 - Section 3.1, last sentence reads that this QMP is applicable for duration of the project, while the QMP plan shall describe the system applicable to the organization (ENSR) overall. Please address.

Response: ENSR's corporate Quality Program Manual describes the systems applicable to the ENSR organization. This document has been referenced in Section 3.1 and included in the revised QMP for the Pines Area of Investigation as Appendix A.

QMP.5 - The Section 3.2. should provide details about the systematic planning process during QAPP development. The guidances used for the Systematic planning of projects (Data Quality Objectives) should be referenced in QMP. Referenced Section 8 does not provide sufficient details.

Response: ENSR's corporate Quality Program Manual (provided as Appendix A of the revised QMP) provides details about the systematic planning process used during development of the Quality Assurance Project Plan (QAPP). Applicable guidance used to develop the QAPP for the Pines Area of Investigation is provided in Volume 3 of the Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Pines Area of Investigation, which has been referenced in this section of the revised QMP.

QMP.6 - The guidances used for the developing Data Quality Objectives (DQOs) should be referenced in section 3.3.3.

Response: Applicable guidance used to develop data quality objectives (DQOs) for the Pines Area of Investigation is provided in the QAPP, which is Volume 3 of the RI/FS Work Plan for the Pines Area of Investigation. The applicable guidance has been referenced in Section 3.3.3 of the revised QMP.

QMP.7 - EPA Requirements for QAPPs (QA/R-5) and Region 5 Instructions on Preparation of a Superfund Division QAPP, June 2000 should be referenced in the QMP.

Response: This guidance has been referenced in Sections 3.2 of the revised QMP.

QMP.8 - This section should clearly identify who is responsible for QMP preparation, review and revisions.

Response: Comment will be addressed; persons responsible for preparing, reviewing, and revising the QMP for the Pines Area of Investigation has been identified in 3.1 and Section 9.0.

Personnel Qualification and Training, Section 4

QMP.9 - The QMP did not describe the ways in which the management will encourage professional development beyond initial qualification; nor how they will identify qualified trainers; assess the effectiveness of training and where applicable establish a program for training and updating the instructors on training techniques and technical changes.

Response: ENSR's corporate Quality Program Manual describes the ways in which its management encourages professional development and how qualified trainers are identified. This corporate plan

has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A.

QMP.10 - The QMP did not describe the process for identifying the need for quality-related retraining based on changing requirements.

Response: ENSR's corporate Quality Program Manual describes the process for identifying the need for quality-related retraining based on changing requirements. This corporate plan has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A.

Procurement of Items and Services, Section 5

QMP.11 - This QMP does not describe process for reviewing and approving applicable responses to solicitation to ensure that they satisfy all technical and quality requirements. In Section 5.1.2 of the QMP ENSR's subcontracting policy and procedures are referenced, but the process is not described in details.

Response: ENSR's corporate Quality Program Manual describes the process for reviewing and approving applicable responses to solicitation to ensure that they satisfy all technical and quality requirements. This corporate plan has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A.

QMP.12 - This QMP does not describe the process for the review and approval of suppliers' quality-related documentation (e.g., QAPPs and QMPs)

Response: ENSR's corporate Quality Program Manual describes the process for review and approval of subcontractors' quality-related documentation. This corporate plan has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A.

Documents and Records, Section 6

QMP.13 - This section of QMP should describe in details process for maintaining documents and records including transmittal, distribution, retention, access, traceability, removal of obsolete documentation, and disposition. The process described very briefly.

Response: ENSR's corporate Quality Program Manual describes the process for maintaining documents (i.e., records management). This corporate plan has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A.

Computer Hardware and Software, Section 7

QMP.14 - The section does not describe the process for developing, installing, testing, using, maintaining, controlling, and documenting computer hardware and software.

Response: ENSR's corporate Quality Program Manual describes the process for computer hardware and software configuration control. This corporate plan has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A. In addition, ENSR maintains several Standard Operating Procedures (SOPs) regarding computer hardware and software; these SOPs have also been referenced in this section and included as Appendix A of the revised QMP for the Pines Area of Investigation.

QMP.15 - The process for ensuring that computer hardware used in environmental programs meets technical requirements and quality expectation should be described.

Response: ENSR's corporate Quality Program Manual describes the process for computer hardware and software configuration control. This corporate plan has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A.

QMP.16 - The process for evaluating purchased hardware and software should be described.

Response: ENSR's corporate Quality Program Manual describes the process for computer hardware and software configuration control. This corporate plan has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A.

QMP.17 - The ENSR's Quality Program Manual referenced in Section 7.1. If this manual used by the purchasing department and possible for other ENSR activities, appropriate sections of this manual should be part of the QMP.

Response: As discussed in a conference call with USEPA Region 5 on April 7, 2005, ENSR has included its corporate Quality Program Manual as Appendix A to the revised QMP for the Pines Area of Investigation.

Planning, Section 8

QMP.18 - The description of the systematic planning process for environmental data collection should be described.

Response: A description of the systematic planning process for environmental data collection has been described. This description is similar to that provided to ENSR in the QMP for Barr Engineering Company (example provided to ENSR by USEPA Region 5).

QMP.19 - The detail process for developing, reviewing, approving, implementing, and revising QAPPs should be described in this section.

Response: The process for developing, reviewing, approving, implementing, and revising QAPPs is described in ENSR's corporate Quality Program Manual, which has been provided as Appendix A to the revised QMP for the Pines Area of Investigation.

QMP.20 - EPA Requirements for QAPP (QA/R-5) and Region 5 Instructions on Preparation of a Superfund Division QAPP, June 2000 should be referenced in the section.

Response: These documents have been referenced in Section 3.3 and referred to in this section of the revised QMP for the Pines Area of Investigation.

QMP.21 - This section should describe the process for evaluating and qualifying data collected for other purposes or from other sources.

Response: The process for evaluating and qualifying data collected for the Pines Area of Investigation is described in the QAPP, which is provided as Volume 3 of the RI/FS Work Plan (of which the QMP is Volume 7). The appropriate sections of the QAPP have been referenced in this section of the revised QMP for the Pines Area of Investigation.

QMP.22 - This section should identify the acceptance criteria for results or measurements of performance by which customer satisfaction will be determined.

Response: The acceptance criteria for results or measurements of performance by which customer satisfaction will be determined for the Pines Area of Investigation is described in the QAPP, which is provided as Volume 3 of the RI/FS Work Plan (of which this QMP is Volume 7). The appropriate sections of the QAPP have been referenced in this section of the revised QMP for the Pines Area of Investigation.

Implementation of Work Processes, Section 9

QMP.23 - The process for ensuring that work is performed according to planning and technical documents should provide more details.

Response: Project performance and review are discussed in ENSR's SOP for Senior Review. This SOP has been provided in Appendix B of the revised QMP for the Pines Area of Investigation.

QMP.24 - This section should provide more details in the removal of obsolete documentation from work area, and verification that the changes are made as prescribed.

Response: ENSR's corporate Quality Program Manual describes the process for maintaining documents (i.e., records management). This corporate plan has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A.

QMP.25 - The process for controlling and documenting the release, change, and use of planned procedures should be described.

Response: ENSR's corporate Quality Program Manual describes the process for controlling and documenting the release, change, and use of SOPs. This corporate plan has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A.

Quality Assurance Assessment and Corrective Action, Section 10

QMP.26 - This section does not describe the process for assessing the adequacy of the ENSR quality system. It's addresses only project specific assessments.

Response: As discussed in a conference call with USEPA Region 5 on April 7, 2005, ENSR is submitting its corporate Quality Program Manual as Appendix A to the QMP for the Pines Area of Investigation. The corporate plan discusses the quality systems applicable to ENSR, including the process for assessing the adequacy of ENSR's quality system. The QMP will remain a project-specific document pertaining to the Pines Area of Investigation.

QMP.27 - The process for planning, implementing and documenting assessment and reporting the results to management applicable to ENSR not only project related, should be described in details.

Response: As discussed in a conference call with USEPA Region 5 on April 7, 2005, ENSR is submitting its corporate Quality Program Manual as Appendix A to the QMP for the Pines Area of Investigation. The corporate plan discusses the quality systems applicable to ENSR, including the process for planning, implementing and documenting assessment and reporting the results to ENSR management. The QMP will remain a project-specific document pertaining to the Pines Area of Investigation.

QMP.28 - This section should clearly specify which assessment tools (such as quality system audits, performance evaluation, peer reviews, readiness reviews, surveillance, etc.) will be used to examine the effectiveness of the technical and QA/QC activities in a project.

Response: ENSR's corporate Quality Program Manual specifies the assessment tools that are used to examine the effectiveness of the technical and QA/QC activities in a project. This corporate plan has been referenced in this section and included in the revised QMP for the Pines Area of Investigation as Appendix A.

Quality Improvement, Section 11

QMP.29 - It should identified in the section, if the reanalysis of the samples are not possible due to holding time, the resampling will be performed.

Response: The acceptance criteria for results or measurements of performance for the Pines Area of Investigation is described in the QAPP, which is provided as Volume 3 of the RI/FS Work Plan (of which this QMP is Volume 7). The QAPP has been referenced in Section 8.4 of the revised QMP.

COMMENTS DATED APRIL 26, 2005

QMP 30 (1). The sections of the QMP where the attached ENSR's corporate Quality Program Manual will be referenced must specify pages, paragraphs, etc. where the information could be found, for timely review. It will not be sufficient just to reference the ENSR Manual.

Response: Agreed.

QMP 31 (2). Comment QMP.6 – The guidance used for DQOs should be referenced in Section 3.3.3.

Response: Guidance used for DQOs are referenced as applicable.

QMP 32 (3). Comments QMP.21, 22 – The appropriate sections of the QAPP should be referenced in the QMP.

Response: Agreed.

**SUMMARY OF CHANGES MADE
TO THE MAY 23, 2005 SUBMITTAL OF THE
YARD 520 SAP AND RI/FS WORK PLAN
PINES AREA OF INVESTIGATION**

In June and July 2005, the USEPA provided verbal feedback on the Yard 520 SAP and RI/FS Work Plan for the Pines Area of Investigation submitted to USEPA on May 23, 2005. In addition, the Respondents submitted written responses on July 22, 2005 to two of USEPA's comments, and USEPA provided a response on July 27, 2005 (letter incorrectly dated July 7). This correspondence can be found at the end of this Appendix. The following changes were made in the various volumes of the Work Plan in response to USEPA verbal comments. Conditional approval of these changes was received August 18, 2005 (RI/FS Work Plan) and August 24, 2005 (Yard 520 SAP).

Yard 520 SAP (Previous version submitted June 3, 2005)

1. In Section 4.3 of the Yard 520 SAP, the language was modified to make it clear that the three types of background samples (road-way, non-road-way, and organic soils) were not intended to be combined together into a single dataset. In addition, reference was made to the HHRA Work Plan where the detailed procedures for the comparison to background data are provided.
2. In Section A7.1 of the QAPP (Appendix C of the Yard 520 SAP), a sentence was added mentioning the three other samples to be collected at Yard 520 under the Field Sampling Plan of the RI/FS Work Plan. Note that USEPA approval of the Yard 520 QAPP was obtained on August 5, 2005.
3. In Tables A-3, A-4, A-5, and A-6 of the QAPP, a footnote was added referring the reader to Section A.7.2 of the QAPP for a discussion of sensitivity.
4. The use of gamma spectrometry was clarified in Tables A-5 and B-2 of the QAPP.
5. The revised version of ENSR SOP 7510Pines was incorporated into this plan. See changes in FSP for more details. A note was added to Table B-1 of the QAPP concerning placement of glass bottles into bags prior to shipping.

Volume 1 - RI/FS Work Plan Volume 1 – Overview

1. This summary of changes was added to the Appendices in Volume 1, and reference to it was included in the document text, Section 1.1.

Volume 2 - Field Sampling Plan

1. In Section 2.1.4, the text was modified to make it clear that the laboratory analysis of the three samples to be collected in the Type II (North) Area at Yard 520 will include boron, molybdenum, silicon, and sulfur. This information was clear on Table 2-1, so no corresponding change was needed in the table.
2. In Sections 2.1.7 and 2.4.3, text was added to clarify that historical data from Yard 520 monitoring wells, although not necessarily consistent with RI/FS procedures, can be used to evaluate trends over time and seasonal variability. A new table (Table 2-3) was added that outlines the current groundwater monitoring program for Yard 520.
3. ENSR SOP 7510Pines was revised to specify that aqueous samples in glass containers should be sealed in a zipper-lock bag to prevent leakage and cross-contamination in the case of breakage. This modified SOP is also attached to the final version of the Yard 520 Sampling and Analysis Plan and the Quality Assurance Project Plan.
4. The piezometer in Indiana Dunes National Lakeshore (IDNL) was changed to a monitoring well as requested in USEPA's letter of July 27, 2005 (attached, incorrectly dated July 7). Appropriate changes were made to the text, tables, and figures.
5. One piezometer will be completed in the Type II (North) Area at Yard 520, as requested in USEPA's letter of July 27, 2005 (attached, incorrectly dated July 7). Appropriate changes were made to the text, tables, and figures.
6. The schedule for the bioavailability testing (Figure 4-1) has been extended by several months to cover logistics of contracting and scheduling with the researcher.

Volume 3 - Quality Assurance Project Plan

Note that USEPA approval of the QAPP was obtained on July 22, 2005.

1. In Tables A-3, A-4, and A-5, a footnote was added referring the reader to Section A.7.2 of the QAPP for a discussion of sensitivity.
2. It was determined that orthophosphate (rather than phosphate) was the more appropriate parameter. Orthophosphate will be measured using EPA Method 365.1 rather than EPA Method 300.0. As a result, appropriate changes were made in Tables A-1, A-2, A-5, A-6, B-2, B-3, B-5, and B-8. The laboratory SOP for this method was included in Attachment D-1.
3. The revised version of ENSR SOP 7510Pines was incorporated into this plan. See changes in FSP for more details. A note was added to Table B-1 of the QAPP concerning placement of glass bottles into bags prior to shipping.

Volume 4 - Health and Safety Plan

No changes.

Volume 5 - Human Health Risk Assessment Work Plan

1. USEPA requested additional information regarding the use of census data in the risk assessment for exposure duration. A paragraph was added to Section 5.2.1 to explain that it is difficult to determine residential occupancy time based on census data, and that the 30-year exposure duration was derived by USEPA based on a combination of sources, including a survey conducted by the Census Bureau. Two references were added to the reference list to support this, and “as cited by USEPA, 1997a” was added to the U.S. Census Bureau 1993 reference.
2. USEPA questioned why the recreational child is not assumed to ingest fish. Section 5.2.2 was revised to include data indicating that young children ingest little to no freshwater fish.
3. The risk level for COC selection (risk drivers at the end of the risk assessment) was discussed. It was pointed out that the risk level for screening and the identification of COPCs for inclusion in the quantitative risk assessment is 1×10^{-6} , as presented in the work plan. No change is required currently.

Volume 6 - Ecological Risk Assessment Work Plan

1. In Section 1.2.1, the following sentence was removed in order to clarify that the Yard 520 was being considered in the SERA consistent with the other exposure areas – “The results from the Yard 520 Stormwater Retention Area will be evaluated in terms of assessing its potential as an attractive nuisance and the risk results included in the SERA.”
2. In Section 1.2.2, two of the criteria for the determination of ecological habitat were modified. The distance or proximity to major roadways will be based on representative widths of existing right-of-ways (as defined by the entities responsible for the various roadways (i.e., state, county, or Town of Pines)). Reference to “>50%” has been removed from the last bullet regarding the minimum percentage of vegetative cover. Best professional judgment considering quality and percent of cover will be used to select areas of ecological habitat.
3. In Section 3.1.1, the text was clarified to indicate that fish tissue will be modeled from surface water and/or sediment concentrations in the SERA.
4. Text was added to Section 3.1.1 to indicate that IDNL staff will be involved in Brown ditch reconnaissance and that multiple dredge spoil samples will be collected.
5. In Sections 3.2.4.1 and 3.2.4.2, references to frequency of detection and background evaluations were removed from the first sentence regarding initial COPEC identification. However, per our

discussions and consistent with AOC II, background will be used in subsequent screening stages for each of the media. Standard language is appended at the ends of Sections 3.2.4.1-3.

6. In Section 3.2.4.1, the hierarchy for the selection of surface water screening values has been clarified and two additional sources have been included as suggested by USEPA (i.e., on-line Ecological Benchmark Tool and a Canadian compendium of benchmarks).

7. USEPA requested that the diet of the little brown bat reflect consumption of aquatic insects. Therefore, Section 3.3.2 and Tables 3-2 and 3-3 have been modified to present the little brown bat as an insectivorous mammalian receptor in the aquatic, not terrestrial, exposure areas. The diet of the bat has been changed from terrestrial insects (modeled from soil) to benthic/aquatic invertebrates (modeled from sediment).

8. Text has been added to Section 3.3.3 to clarify that the food web will be conducted with conservative assumptions (i.e., AUF of 1 and exposure duration of 100%) and that drinking water exposure will consider the total recoverable (not dissolved) concentration of COPECs.

9. In Table 3-2, text has been added to indicate that terrestrial invertebrates may be exposed to deeper soils (0 to 5 feet), not only surface soils.

10. Section 3.3.4 and Table 3-3 have been modified to indicate that, as requested by USEPA, juvenile body weights will be used to model food web exposure. If juvenile body weights are not identified in the literature (i.e., USEPA Wildlife Exposure Factors Handbook or wildlife guide books), the low end of the adult range will be used. Food and water ingestion rates, if not available from studies with juvenile receptors, will be based on allometric equations presented in USEPA Wildlife Exposure Factors Handbook. If juvenile body weights are not available, the ingestion rates will be calculated based on the high end of the adult body weights identified (i.e., the low end of the adult range will be selected for the receptor body weight but the high end of the range will be used to establish the ingestion rate).

11. USEPA has requested that the diets of carnivores, insectivores, and herbivores be composed of 100% of the most contaminated food item. Section 3.3.4 and Table 3-3 have been modified to reflect this request. The diets of the herbivores and insectivores have been changed to reflect exclusive diets of plants and invertebrates, respectively. At this time it is impossible to know which food items for the carnivores (i.e., invertebrates, fish, small mammals) will be the most contaminated so the relative diets in Table 3-3 may be modified during the SERA (i.e., after tissue concentrations are calculated). Omnivores will maintain a mixed diet as indicated in Table 3-3.

12. USEPA indicated that the mourning dove may be more appropriate than the meadowlark to evaluate risk due to grit exposure. However, no information has been identified for soil ingestion by the mourning dove. USEPA agreed to maintain the use of the meadowlark, but to increase the soil ingestion rate using another ground forager as a surrogate. Therefore, soil ingestion of the meadowlark in Table 3-3 has been increased to 9.3% based on the wild turkey.

13. USEPA identified a soil ingestion of 13% for the least shrew which has been included in Table 3-3.

14. USEPA has indicated that body weight scaling should not be used to adjust the toxicity reference factors for mammals (i.e., to scale NOAELs for surrogate test species to an equivalent NOAEL for receptor species used in the food web). Reference to scaling factors has been removed from Section 3.4.2. Therefore, $NOAEL_{\text{receptor}} = NOAEL_{\text{test species}}$ for both birds and mammals in the food web evaluation.

Volume 7 - Quality Management Plan

USEPA approval was received June 14, 2005. Note that ENSR has added an updated signature page for ENSR's Quality Program Manual (Appendix A of the QMP).

**SUMMARY OF CHANGES MADE
TO THE MAY 23, 2005 SUBMITTAL OF THE
YARD 520 SAP AND RI/FS WORK PLAN
PINES AREA OF INVESTIGATION**

In June and July 2005, the USEPA provided verbal feedback on the RI/FS Work Plan for the Pines Area of Investigation submitted to USEPA on May 23, 2005. The following changes were made in the various volumes of the Work Plan in response to USEPA verbal comments.

Field Sampling Plan

4. USEPA requested that the piezometer proposed to be installed in IDNL north of Maple Street be completed as a well instead. The Respondents believe a well can be installed in this area in the future, if needed, based on the data collected under the current FSP. The well at location A will characterize groundwater conditions where RAL exceedances have been observed in private wells along Maple St. Wells at locations C and D will help define the extent of these exceedances. If RAL exceedances are detected at locations C and/or D, or if groundwater levels indicate that groundwater with elevated concentrations of constituents flows to the north toward IDNL, then a monitoring well in INDL will be considered.

5. USEPA requested that a piezometer be installed in the Type II (North) Area at Yard 520 to measure groundwater levels and evaluate the presence of suspected mounding within Yard 520. The Respondents do not intend to install a piezometer for the following reasons:

- An existing monitoring well, MW-2, is located in the Type II (North) Area. The USEPA has suggested that the location of this well near the clay barrier may not provide representative groundwater levels. In fact, a well near the barrier is an appropriate location to monitor potential mounding. The general direction of groundwater flow in the vicinity of Yard 520 is southeastwards towards Brown Ditch (based on Yard 520 monitoring data and USGS interpretations). When this flow is blocked by the clay barrier, water levels will build up at the barrier until the head is sufficient to re-direct flow around the barrier to the east and west.
- Historical records indicate that placement of fill at Yard 520 was started by filling in of low-lying areas. This indicates that the natural sandy aquifer in the area remains in place (unlike at the Type III (South) Area, where it was excavated). Therefore, this aquifer underlies the fill material at Yard 520, providing a pathway for groundwater movement from beneath the Type II (North) Area. The existence of this sandy aquifer of relatively high permeability makes it difficult for a mound to develop; instead, any excess water levels would create a hydraulic gradient that would allow the water to dissipate through the sands, and a mound could not be sustained.

- The Type II (North) Area of Yard 520 has been closed with a clay cap, installed in 1986 to 1987. The purpose of the cap is to severely restrict rainwater infiltration. This is standard practice for the closure of waste disposal areas. Therefore, there should be little to no recharge to this area to create a significant mound beyond that caused by the clay barrier. Any mounding that may have existed during active operations in the Type II (North) Area would have dissipated in the 20 years since closure. Both the closure plan and the post-closure certification for the cap and final grading of the Type II (North) Area were approved by IDEM.
 - The most recent water levels measured at Yard 520 (April 2005), including tabulated data and groundwater contour maps, are attached to this document. These data show there is no evidence of mounding within the Type II (North) Area at Yard 520.
 - The RI/FS Work Plan currently includes the placement of three borings in the Type II (North) Area at Yard 520. These will be installed using direct-push techniques, which will generate continuous cores of the fill and geologic materials encountered. The presence of water can be observed in these soil cores, which will allow an estimate of the depth to the water table. If these observations suggest there may be significant groundwater mounding, installation of a piezometer may be considered.
6. As discussed with the USEPA, the schedule for the bioavailability testing (Figure 4-1) has been extended by several months to cover logistics of contracting and scheduling with the researcher.

June 24, 2005
File: 0013-01-14

**APRIL 2005 GROUNDWATER
MONITORING REPORT**

**Yard 520 RWS
Pines, Indiana**

Prepared For:

**Yard 520 Restricted Waste Site
720 W. U.S. Highway 20
Michigan City, Indiana 46360**

Submitted to:

**Commissioner
Office of Land Quality
Indiana Department of Environmental Management
100 North Senate Avenue, P.O. Box 6015
Indianapolis, Indiana 46204**

CHICAGO, ILLINOIS
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ST. LOUIS, MISSOURI

WEAVER

BOOS

CONSULTANTS

INC

**GEO-ENVIRONMENTAL ENGINEERS
AND SCIENTISTS**

Table 1
Yard 520 Restricted Waste Site
Monitoring Well Network
Pines, Indiana

Well ID	Facility Monitored	Purpose for Monitoring	Up/Down Gradient	Well Diameter (inches)	Location		Elevations (MSL)			Total Well Depth (feet)	Depth to Water (feet) 4-26-05	Elevation of Groundwater Surface (MSL) 4-26-05
					Northing	Easting	Top of Precover	Top of pVC	Ground			
Monitoring Wells												
MW-1	Type II	GW Sampling	up	2	2342181.85	2985885.47	624.31	624.11	622.00	26.94	8.50	615.61
MW-2	Type II	Water Levels	N/A	2	2342111.84	2986773.99	622.09	621.70	619.90	19.67	6.60	615.10
MW-3	Type III	GW Sampling	N/A	2	2341669.65	2986943.77	617.98	617.75	616.00	16.97	10.20	607.55
MW-3A	Type III	Water Levels	N/A	2	2341549.26	2986991.37	623.44	623.26	620.90	22.32	10.84	612.42
MW-4	Type III	GW Sampling	N/A	2	2341355.96	2986308.61	620.67	620.49	619.10	18.68	12.45	608.04
MW-4A	Type III	Water Levels	N/A	2	2341198.37	2986316.29	624.12	623.88	621.20	49.83	9.38	614.50
MW-5	Type II	Water Levels	N/A	2	2342880.34	2987478.67	610.36	610.19	608.90	16.65	3.21	606.98
MW-6	Type II	GW Sampling	side	2	2342964.71	2986858.11	629.96	629.73	627.40	34.92	14.90	614.83
MW-7	Type II	GW Sampling	side	2	2342646.50	2986507.53	627.87	627.32	624.90	23.82	11.39	615.93
MW-8	Type II	GW Sampling	down	2	2342554.26	2987401.46	616.31	615.84	612.40	17.87	8.79	607.05
P-9	Type III	Water Levels	N/A	1	2341939.89	2987406.45	621.30	620.79	617.60	15.24	12.12	608.67
P-10	Type II	Water Levels	N/A	1	2341608.06	2985822.07	617.62	617.04	614.50	15.42	4.87	612.17
MW-10*	Type II	GW Sampling	N/A	2	2341599.02	2985821.03	616.74	615.98	614.50	13.36	3.87	612.11
MW-11	Type II	GW Sampling	down	2	2343020.71	2987440.39	612.55	612.04	609.00	17.73	4.51	607.53
TW-12	Type II	GW Sampling	N/A	2	2342507.05	2986469.33	627.30	626.82	624.00	32.24	11.53	615.29
MW-13D*	Type II	GW Sampling	up	2	2342423.93	2986012.31	627.68	626.97	625.50	33.70	11.35	615.62
MW-13S*	Type II	GW Sampling	up	2	2342422.51	2986011.01	627.74	626.97	625.50	17.82	10.59	616.38
MW-14D*	Type II	GW Sampling	up	2	2342690.01	2986316.53	628.45	627.75	626.10	36.01	12.57	615.18
MW-14S*	Type II	GW Sampling	up	2	2342688.04	2986314.00	628.46	627.78	626.10	19.56	11.77	616.01
TW-15D	Type II	GW Sampling	N/A	2	2343009.03	2986697.79	630.36	629.71	628.00	37.69	15.10	614.61
TW-15S	Type II	GW Sampling	N/A	2	2343007.38	2986696.01	630.43	629.60	628.00	22.75	14.59	615.01
TW-16D	N/A	GW Sampling	N/A	2	2343444.10	2987255.26	632.09	631.45	630.00	42.65	19.91	611.54
TW-16S	N/A	GW Sampling	N/A	2	2343443.09	2987253.13	632.12	631.38	630.00	27.13	19.24	612.14
TW-17D	N/A	GW Sampling	N/A	2	2343241.73	2986720.82	634.08	633.38	631.90	35.57	18.92	614.46
TW-17S	N/A	GW Sampling	N/A	2	2343239.73	2986720.55	634.08	633.42	631.90	27.65	18.93	614.49
TW-18D	N/A	GW Sampling	N/A	2	2343478.41	2987037.36	636.88	636.32	634.80	46.68	24.30	612.02
TW-18S	N/A	GW Sampling	N/A	2	2343480.95	2987037.93	637.10	636.41	634.80	31.75	23.37	613.04
TW-19D	N/A	GW Sampling	N/A	2	2343595.76	2987392.83	633.26	632.70	630.30	44.59	21.72	610.98
TW-19S	N/A	GW Sampling	N/A	2	2343597.60	2987392.25	633.25	632.81	630.30	29.28	21.62	611.19
P-20	Type II	Water Levels	N/A	1	2342142.00	2986841.00	622.77	622.12	618.91	21.79	11.04	611.08
P-21	Type II	Water Levels	down	2	2342481.09	2987500.80	624.79	624.25	621.88	17.66	10.12	614.13

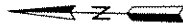
Location ID	Facility Monitored	Purpose for Monitoring	Up/Down Gradient	Location		Elevations (MSL)			Surface Water Level (feet) 4-26-05	Elevation of Surface Water (MSL) 4-26-05
				Northing	Easting	Top of I-Beam	Top of Stream Gauge	Elevation of Zero Mark		
Stream Gauges										
SG-1**	Type III	N/A	up	2341036.02	2985886.45	612.54	612.27	605.61	N/A	N/A
SG-1A**	Type III	SW Sampling	up	2340871.71	2985621.50	613.40	612.65	605.99	1.86	607.85
SG-2	Type III	SW Sampling	down	NA	NA	607.87	607.86	601.83	5.20	607.03
SG-3	Type III	SW Sampling	down	2341338.61	2985882.45	611.38	611.38	604.72	3.62	608.34
SG-5	Type III	SW Sampling	down	NA	NA	607.26	607.25	601.22	5.90	607.12
SG-6	Type III	SW Sampling	down	2342917.32	2987975.55	608.33	608.33	601.67	3.80	605.47

Monitoring locations surveyed on Sept. 9, 2002 by Marbach, Brady & Weaver, Inc.

*Formerly known as TW-10, TW-13D, TW-13S, TW-14D, and TW-14S.

**SG-1 removed from network in January 2003 and replaced with SG-1A.

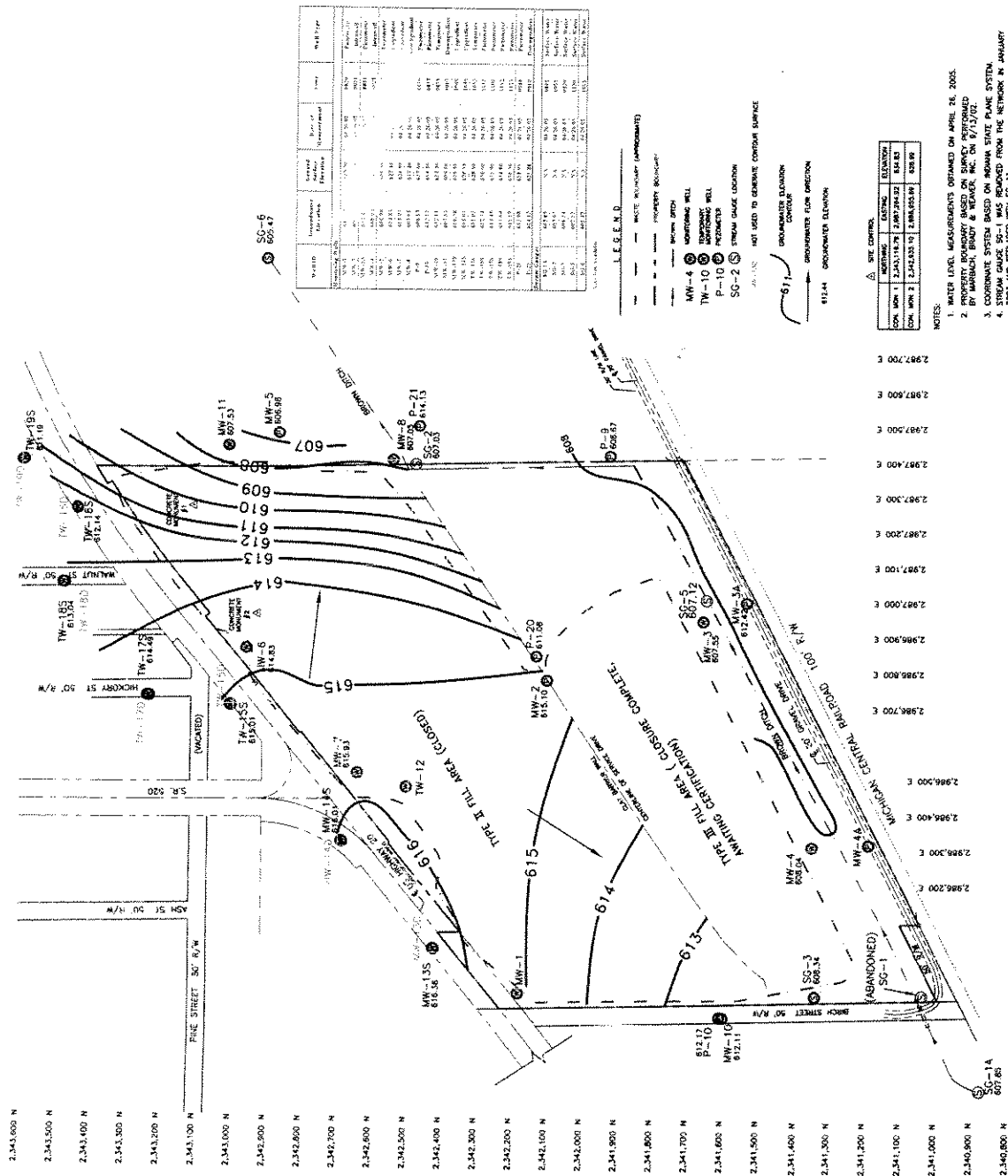
N/A - Not applicable or not available.



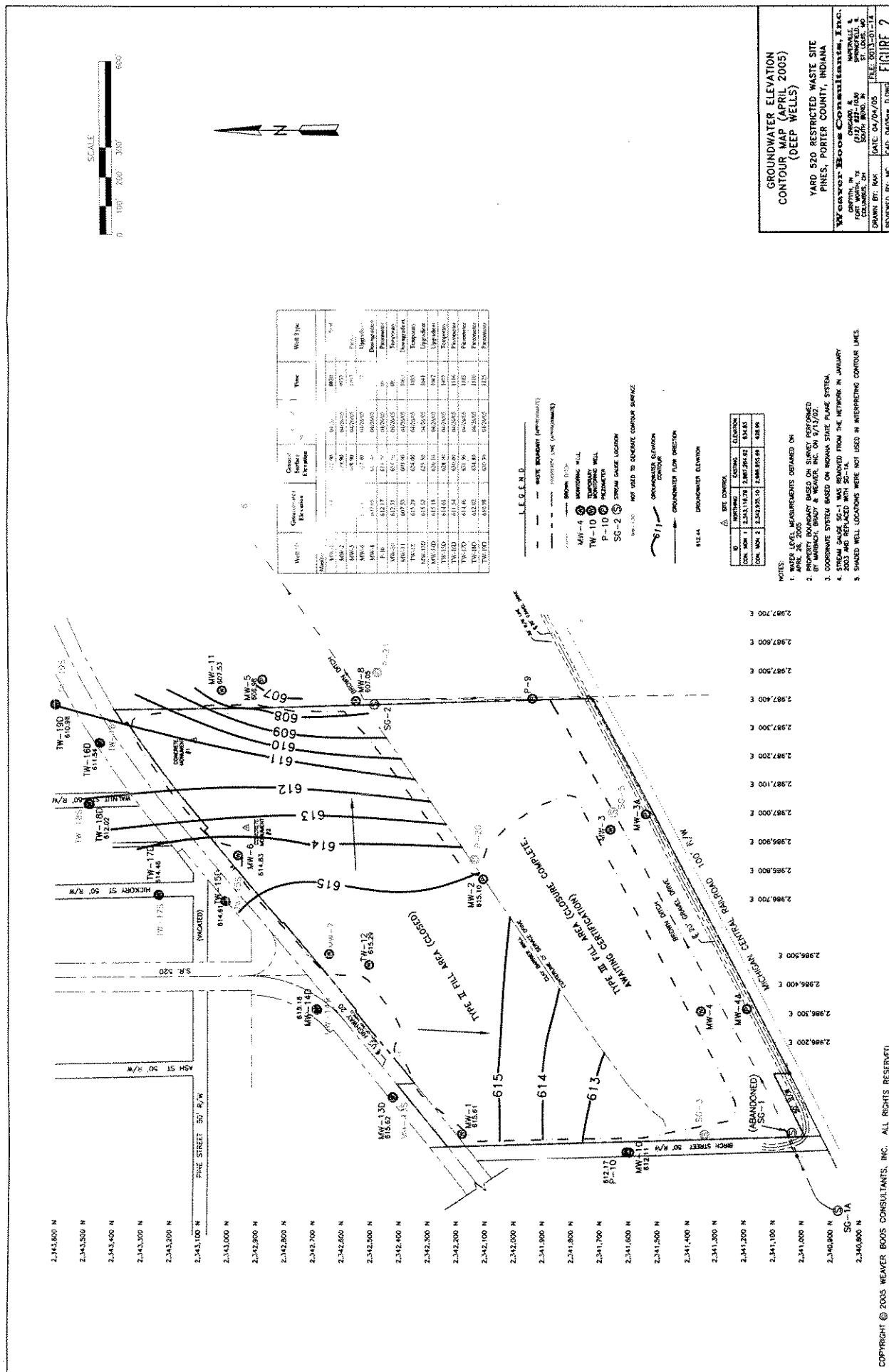
GROUNDWATER ELEVATION CONTOUR MAP (APRIL 2005) (SHALLOW WELLS)

YARD 520 RESTRICTED WASTE SITE
PINES, PORTER COUNTY, INDIANA

Weaver Boos Consultants, Inc.
1001 W. 12th St., Suite 200
Carmel, IN 46032-4200
Phone: 317.833.9300
Fax: 317.833.9301
E-mail: info@weaverboos.com
DATE: 04/24/05
DRAWN BY: BAW
REVIEWED BY: MC
CADD: 040509.dwg
FIGURE 1



- NOTES:
1. WATER LEVEL MEASUREMENTS OBTAINED ON APRIL 24, 2005.
 2. ELEVATIONS ARE BASED ON NGVD 83 DATUM.
 3. COORDINATE SYSTEM BASED ON INDIANA STATE PLANE SYSTEM.
 4. STREAM GAUGE SG-1 WAS REMOVED FROM THE NETWORK IN JANUARY 2003 AND REPLACED WITH SG-1A.
 5. SURVEY COORDINATES FOR SG-1A, SG-2, AND SG-3 WERE NOT AVAILABLE. THEREFORE, THE LOCATIONS OF SG-1A, SG-2 AND SG-3 ARE APPROXIMATE.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

July 7, 2005

SF-5J

Lisa Bradley
Senior Toxicologist
ENSR International
2 Technology Park Drive
Westford, Massachusetts 01886

SUBJECT: Response to Proposed Edits to Pines Site RI/FS Workplan, Dated July 22, 2005

Dear Ms. Bradley:

After a review of the proposed changes e-mailed to me on July 22, 2005 regarding The Pines Site RI/FS Workplan, EPA has concluded that you will complete the proposed location within IDNL north of Maple Street as a monitoring well and not solely as a piezometer. In addition, you will install a piezometer in the proposed sampling location closest to the highest elevation of the Type II (North) Area at Yard 520. These two tasks will be completed for the following reasons.

We require some limited water-quality data from the IDNL up front to more clearly verify the presence or absence of impacts to the lakeshore. Although ENSR's approach of collecting information from outside the IDNL then using that data to determine if additional data collection in the IDNL is required is not without merit, we feel that any investigation has uncertainty associated with due to variations in the hydrogeology, pumping, the strength of the source through time, and the well coverage. It is possible that potential impacts to the IDNL would be missed by not getting at least some preliminary data from IDNL itself. Therefore, we require that a small amount of such data, in the form of a monitoring well in the IDNL location north of Maple Street instead of the proposed piezometer, be collected as part of the first phase, rather than the second phase.

Seeps have been identified in the landfill in the past, indicating the presence of mounding at the landfill. Additionally, flow directions and contaminant locations in this area show a complex relationship, possibly indicating that pumping from the residential wells is affecting boron movement, or that poorly understood hydraulic factors are driving flow. As has been noted previously, we have valid reasons for questioning the representativeness of water-level data from well MW2. We feel it is critical, therefore, that water-level data be collected from a well located at the landfill to help identify if there is a hydraulic mound beneath the landfill, the magnitude of that mound, its potential to better explain the distribution of boron in the aquifer, and the potential for mounding to drive boron migration beyond hydraulic boundaries. This data also

will help in the development of an accurate ground-water flow model. This data is best collected up front, so that it can be compared to water-level and water-quality data collected as part of an integrated RI effort. Collection (possibly) at some later date will just draw out completion of the RI and reduce the effectiveness of the data point by modifying the context of the water-level data relative to the site as a whole. Estimation of the location of the water levels in the landfill based on the landfill cores is worthwhile and should be done, but this data will be inexact as to the location of the water level, potentially the presence of the water level, and the impact of the water level in the waste on water levels in the aquifer (water levels in the waste likely will be higher than in the aquifer, and there may even be an unsaturated zone between the saturated waste and the aquifer). For these reasons, we will require a piezometer in the Type II (North) Area.

Please contact me to confirm that these changes will be made to the Pines RI/FS workplan. We feel that with these issues resolved, we should be able to quickly finalize the documents.

If you have any questions on these decisions, please call me at (312) 353-4367.

Sincerely,

A handwritten signature in black ink, appearing to read 'Tim Drexler', with a stylized flourish at the end.

Tim Drexler
Remedial Project Manager

cc: L. Johnson, Office of Regional Counsel
S. Padovani, Chief, Section #4 Remedial Response Branch